

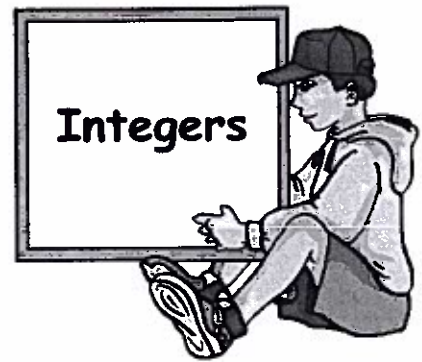


Bearsden Academy

S2 - Block 2 Topics

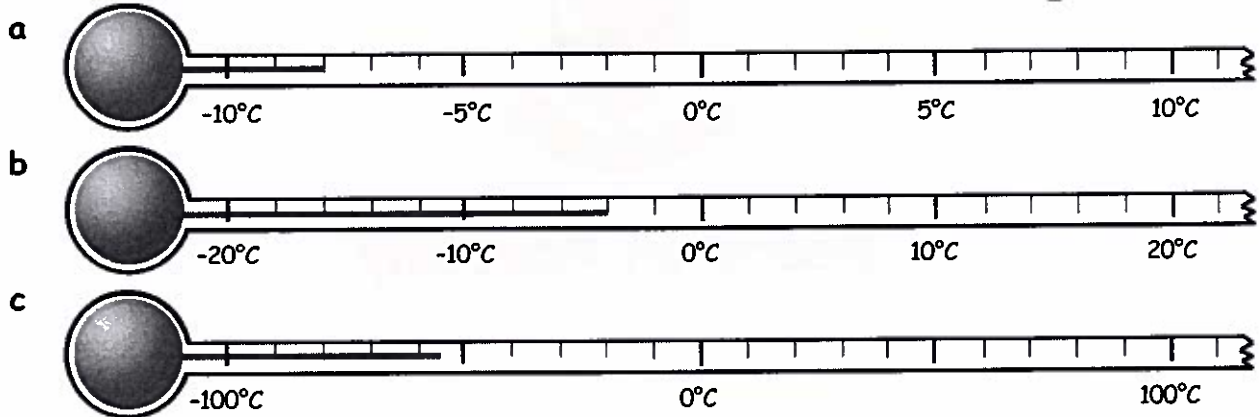
- Bodmas (with integers)
- Significant Figures
- Scientific notation
- Pythagoras
- Algebra - Collecting like terms, removing brackets, solving equations and solving inequalities

CHAPTER 4



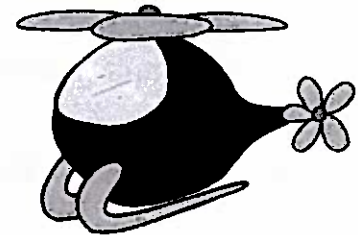
Exercise 1 Integers

1. What temperatures are shown on each thermometer?



2. a Bill has a bank balance of $-\pounds 45$. Explain what this means.
 b Iritus Maximus was born 34 BC and died 45 AD. How old was he when he died?

3. A diver is 10 m below the surface of the water.
 A helicopter is 100 m above the water.
 How many metres is the diver below the helicopter?



4. Find the temperature that is :-
 a 8°C up from -3°C . b 7°C down from 2°C
 c 11°C up from -15°C d 8°C down from -6°C .

Exercise 2 Adding & Subtracting Integers



1. Find :-

- | | | | | | | | |
|---|---------------|---|-------------|---|--------------|---|-------------------|
| a | $11 - 12$ | b | $6 - 11$ | c | $(-3) + 5$ | d | $1 - 3$ |
| e | $(-9) + 9$ | f | $(-4) - 2$ | g | $(-6) - 7$ | h | $(-3) + (-1)$ |
| i | $(-121) + 21$ | j | $134 - 165$ | k | $(-30) - 40$ | l | $(-50) + (-40)$. |

2. a $34 - 121$ b $2.7 - 4.2$ c $8.7 + (-4.8)$ d $(-1.4) - 3.8$
 e $11.6 - 13.7$ f $63.1 + (-36.1)$ g $(-12.1) + (-16.9) - 9.2$
 h $11k - 12k$ i $111g - 121g$ j $15t + (-11t) - 3t + t$.

Exercise 3**Subtracting Negatives**

1. Find :-

- | | | | | | | | |
|---|-----------------|---|------------------|---|---------------|---|---------------------|
| a | $4 - (-2)$ | b | $8 - (-1)$ | c | $10 - (-5)$ | d | $70 - (-30)$ |
| e | $(-3) - (-2)$ | f | $(-1) - (-1)$ | g | $(-8) - (-7)$ | h | $(-11) - (-6)$ |
| i | $(-34) - (-21)$ | j | $(-121) - (-77)$ | k | $73 - (-54)$ | l | $(-243) - (-233)$. |

2. Find :-

- | | | | | | | | |
|---|-----------------|---|-----------------|---|---------------------------|---|------------------|
| a | $4x - (-2x)$ | b | $7y - (-4y)$ | c | $23k - (-14k)$ | d | $156i - (-127g)$ |
| e | $111d - (-88d)$ | f | $(-3w) - (-4w)$ | g | $(-40j) - 11j - (-20j)$. | | |

Exercise 4**Multiplying/Dividing Negatives**

1. Find :-

- | | | | | | | | |
|---|-----------------|---|------------------|---|------------------|---|-------------------|
| a | $3 \times (-2)$ | b | $8 \times (-1)$ | c | $12 \times (-5)$ | d | $10 \times (-30)$ |
| e | $(-3) \times 4$ | f | $(-1) \times 6$ | g | $(-8) \times 7$ | h | $(-11) \times 4$ |
| i | $(-9) \div 3$ | j | $(-121) \div 11$ | k | $72 \div (-9)$ | l | $243 \div (-3)$. |

2. Find :-

- | | | | | | | | |
|---|--------------------|---|--------------------|---|--------------------|---|----------------------|
| a | $(-4) \times (-2)$ | b | $(-3) \times (-4)$ | c | $(-7) \times (-9)$ | d | $(-11) \times (-12)$ |
| e | $15 \div (-5)$ | f | $(-30) \div (-5)$ | g | $(-40) \div (-8)$ | h | $(-243) \div (-3)$. |

3. Find :-

- | | | | | | | | |
|---|----------------------|---|---------------------|---|-------------|---|----------------------------------|
| a | $(-11 + 3) \times 2$ | b | $(7 - 11) \times 5$ | c | $(-1)^{17}$ | d | $(-1) \times (-7) \times (-2)$. |
|---|----------------------|---|---------------------|---|-------------|---|----------------------------------|

Exercise 5**Mixed Exercise**

1. Find :-

- | | | | | | | | |
|---|-------------------|---|-----------------|---|---------------------------|---|---------------------------------|
| a | $-3 + 8$ | b | $8 - (-2)$ | c | $9 + (-3) - (-5)$ | | |
| d | $5 \times (-4)$ | e | $(-3) \times 6$ | f | $(-5) \times (-7)$ | g | $35 \div (-5)$ |
| h | $(-64) \div (-8)$ | i | $(-1)^{191}$ | j | $(-1)^9 \times (-1)^{11}$ | k | $(-10) \times (-1) \div (-2)$. |

2. For every 100 m a weather balloon rises the temperature drops by 2.5°C .

If at ground level the temperature is 11°C , what would the temperature be at a height of 2.1 km ?



Revisit - Review - Revise Exercise 4



1. Find :-

- | | | | | | | | |
|---|-------------------|---|-----------------|---|---|---|---------------------|
| a | $-6 + 8$ | b | $11 - 21$ | c | $(-2) + 4$ | d | $-1 - 3$ |
| e | $(-9) + (-9)$ | f | $(-5) - 5$ | g | $(-6) - (-7)$ | h | $(-3) + (-1)$ |
| i | $(-32) - (-21)$ | j | $3 \times (-5)$ | k | $(-3) \times 4$ | l | $(-5) \times (-4)$ |
| m | $16 \div (-2)$ | n | $(-72) \div 4$ | o | $8.1 \times (-4)$ | p | $(-14) \times (-3)$ |
| q | $(-81) \div (-3)$ | r | $63 \div (-6)$ | s | $(-12) + (-16) - (-9) - 6$ | | |
| t | $13k - 17k$ | u | $154g - (-67g)$ | v | $11q + (-11q) - (-3q) + 7q - q$ | | |
| w | $(-1)^1$ | x | $(-1)^{1003}$ | y | $(-4) \times (-3) \times (-1) \times 2 \div (-6)$ | | |

2. a Julius Janitorius was born in 23 BC and died in 16 AD.

How old was Julius when he died ?



b



The temperature of a freezer dropped from 3°C to -17°C . How much had the temperature dropped ?

Cumulative Ex 1



1. Round each of these numbers to the number of decimal places in the brackets :-

- a 7.642 (1) b 11.1786 (2) c 0.99918 (3) d 15.5162 (0).

2. Round each of the numbers in question 1 to two significant figures.

3. Find :-

- a 43×30 b 500×68 c $46\,800 \div 400$.
d $150\,000 \div 200$ e $10 + 5 \times 3$ f $30 - 120 \div 40 + 10$.

4. Write down the :-

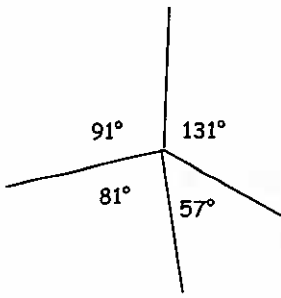
- a complement of 20° b the supplement of 80° .

5. A triangle has two of its angles 37° and 49° . What is the other angle ?

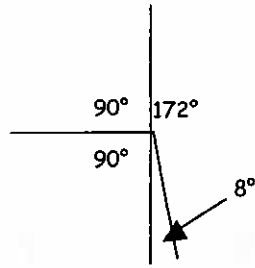
6. Calculate :-

- a $(-7) + 4$ b $(-3) + (-3)$ c $-11 - (-8)$
d -5×3 e $-12 \times (-2)$ f $(-3) \times (-3) \times (-3)$
g $50 \div (-5)$ h $-72 \div 8$ i $-36 \div (-3)$.

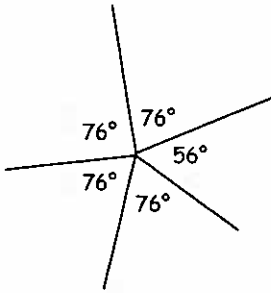
e



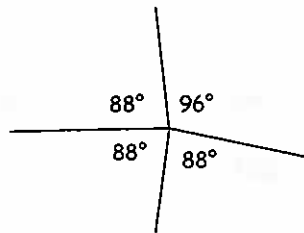
f



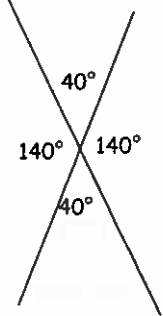
g



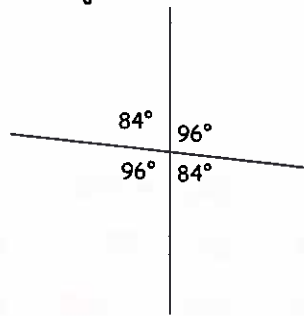
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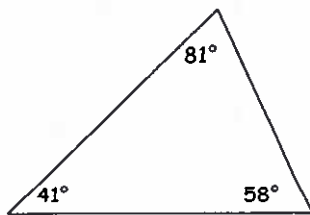
i



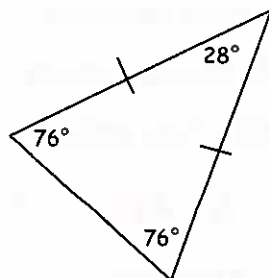
j



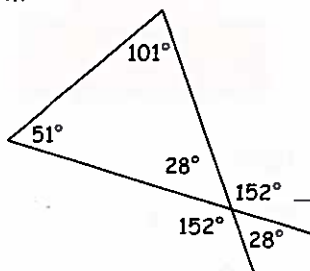
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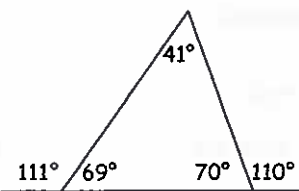
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m



n



Answers to Chapter 4

Exercise 1 - Integers

- a -8°C b -4°C c -55°C
- a Overdrawn by £45 b 79 or 80
- 110 m
- a 5°C b -5°C c -4°C d -14°C

Exercise 2 - Adding and Subtracting Integers

- a -1 b -5 c 2 d -2
e 0 f -6 g -13 h -4
i -100 j -31 k -70 l -90
- a -87 b -1.5 c 3.9 d -5.2
e -2.1 f 27 g -38.2
h -k i -10g j 2t

Exercise 3 - Subtracting Negatives

- a 6 b 9 c 15 d 100
e -1 f 0 g -1 h -5
i -13 j -44 k 127 l -10
- a $6x$ b $11y$ c $37k$ d $283i$
e $199d$ f w g $-31j$

Exercise 4 - Multiplying/Dividing Negatives

- a -6 b -8 c -60 d -300
e -12 f -6 g -56 h -44
i -3 j -11 k -8 l -81
- a 8 b 12 c 63 d 132
e -3 f 6 g 5 h 81
- a -16 b -20 c -1 d -14

Exercise 5 - Mixed Exercise

- a 5 b 10 c 11
d -20 e -18 f 35 g -7
h 8 i -1 j 1 k -5
- -41.5°C

Review - Revisit - Revise Exercise 4

- a 2 b -10 c 2 d -4
e -18 f -10 g 1 h -4
i -11 j -15 k -12 l 20
m -8 n -18 o -32.4 p 42
q 27 r -10.5 s -25
t $-4k$ u $221g$ v $9q$
w -1 x -1 y 4
- a 39 or 40 b 20-C

Cumulative Exercise 1

- a 7.6 b 11.18 c 0.999 d 16
- a 7.6 b 11 c 1.0 d 16

Exercise 6



1. Use **BOMDAS** to help you calculate :-

a $12 + 9 \times 2$

b $40 - 28 \div 4$

c $30 - 18 \div 2 - 13$

d fifth of $70 - 10$

e $10 + \frac{1}{2}$ of 50

f $15 - \frac{1}{4}$ of $20 + 4$

g $8 \times 2 - 21 \div 3 + 6$

h $7 \times 6 - 2 \times 9 + 20 \div 4$

i $9 - \frac{1}{5}$ of $(50 - 20)$.

2. Find, showing two more steps each time :-

a $7 + (18 \div 2)$

b $54 \div (12 - 3)$

c $5 \times (14 \div 6)$

d $200 \div (16 + 4)$

e $6 \times (7 + 3) - 50$

f $(6 + 3) \times (7 - 2) + 5$.

g $25 - \frac{1}{8}$ of 40×5

h $\frac{1}{3}$ of $(\frac{1}{6}$ of 18)

i $((6 + 4) \div 2) \times 3 - 10$.

3. Copy each of the following and **insert brackets** to make each calculation correct :-

a $8 + 3 \times 4 = 44$

b $23 - 6 \times 3 = 5$

c $20 + 8 \div 7 = 4$

d $2 + 8 \div 2 \times 8 = 34$

e $12 + 20 \div 10 - 7 = 7$

f $6 + 4 \times 8 - 5 \div 2 = 15$.

Revision Exercise



1. a Round to the nearest 10 :- (i) 59 (ii) 4783 (iii) 16 845
b Round to the nearest 100 :- (i) 238 (ii) 1570 (iii) 19173
c Round to the nearest 1000 :- (i) 2647 (ii) 31498 (iii) 456 502.

2. a Round both numbers to the nearest 10, then estimate :- $478 + 296$
b Round both numbers to the nearest 100, then estimate :- $6391 - 2524$
c Round both numbers to the nearest 1000, then estimate :- $14760 + 5438$.

3. Estimate :- a 5376×9 b $20875 \div 7$.

4. The population of Wales in July of 2011 was 3 028 899.
Round this number to the nearest ten thousand.



5. Set down these calculations and work them out :-

a $18\,479 + 416$

b $49\,103 - 34\,877$

c 1946×7

d 3958×4

e $584\,538 + 126\,496$

f $13\,875 \times 9$

g $137\,905 \div 5$

h $26\,328 \div 3$

i $2\,480\,023 \div 7$.

Answers to Chapter 1

Consolidation

- four hundred and eighteen thousand seven hundred and six
- 64071
- 50120 50112 49318 49138 48992 48979
- A 4000 B 4150
- 53000
- a 6301 b 4674 c 8590 d 1307
- a 80 b 790 c 4890
- a 1500 b 8600 c 72400
- 20000
- a 66024 b 4754 c 23823 d 647
- a 31620 b 60300 c 391 d 58
- 2002 miles
- £347

Exercise 1

- a 3 million b 6000 c 90000 d 500000
- a 500 b 50 c 5000 d 5 million
- a thirty four thousand six hundred
b five hundred and sixty one thousand and ninety
c one million seven hundred and thirty thousand
d eight million fourteen thousand and fifty
- a 640008 b 3912000 c 14030072
- 100640 100460 100064 99939 98889 89988
- a 540 b 1840 c 180003
d 792500 e 1700400
- A 15900 B 16700 C 40000 D 55000
E 250000 f 380000
- a 4500 b 52450 c 1100000
- a 500000 b 1750000 c 2250000

Exercise 2

- a 1260 b 4920 c 13400
d 249600 e 168000 f 2160000
- a 16410 b 250020 c 453920 d 888660
e 98850 f 423290 g 735380
- a 123600 b 138900 c 285600 d 673200
e 4890000 f 1896000 g 48090000
- a 20000 b 160000 c 27000000
d 60 e 7000 f 3100
- 4320000 seconds

Exercise 3

- a 80 b 290 c 10 d 710
e 3770 f 8900 g 4100 h 14490
- a 800 b 400 c 7600 d 8500
e 23300 f 26900 g 88200 h 48000
- a 6000 b 19000 c 84000 d 18000
e 468000 f 385000 g 370000 h 300000
- a £79000000 b £80000000

Exercise 4

- a 3200 b 3000 c 5000 d 30000
e 27000 f 180000 g 10 h 100
i 30 j 2000 k 50 l 20
- a 14000 g b £150 c 8000000 miles

Exercise 5

- 333270
- 425
- 205
- a £965 b £290
- Marjorie by £30.40

Exercise 6

- a 30 b 33 c 8
d 4 e 35 f 14
g 15 h 29 i 3
- a 16 b 6 c 100
d 10 e 10 f 50
g 0 h 1 i 5
- a $(8 + 3) \times 11 = 44$ b $23 - (6 \times 3) = 5$
c $(20 + 8) \div 7 = 4$ d $2 + (8 \div 2) \times 8 = 34$
e $12 + (20 \div 10) - 7 = 7$
f $(6 + 4) \times (8 - 5) \div 2 = 15$

Revision Exercise

- ai 60 ii 4780 iii 16850
bi 200 ii 1600 iii 19200
ci 3000 ii 31000 iii 457000
- a 780 b 3900 c 20000
- a 45000 b 3000
- 3030000
- a 18895 b 14226 c 13622
d 15832 e 711034 f 124875
g 27581 h 8776 i 354289
- a 5400 b 762000 c 47600 d 3000000
e 47 f 275 g 37010 h 6108
- a 3780 b 15600 c 268500 d 920000
e 9 f 29 g 9338 h 580
- a 12227 miles b 673 miles
- 8749
- £420
- £7.50
- a £5472 b £272
- a £36750 b £1531.25

Answers to Chapter 2

Consolidation

- The shape can be folded in two different ways both halves matching each time.
- a 1 b 2 c 4 d 0
e 4 f 1 g 12 h 5

CHAPTER 1



Exercise 1

Decimal Places & Rounding



1. Round each of the following to **one** decimal place :-

- | | | | |
|----------|---------|----------|----------|
| a 8.63 | b 3.77 | c 9.051 | d 2.949 |
| e 11.123 | f 54.96 | g 0.0612 | h 99.97. |

2. Round each of the following to **two** decimal places :-

- | | | | |
|-----------|-----------|----------|-----------|
| a 1.768 | b 12.125 | c 7.706 | d 9.0052 |
| e 3.04399 | f 0.01517 | g 99.987 | h 99.999. |

3. Round each of these numbers to the number of decimal places in the brackets :-

- | | | | |
|-------------|--------------|--------------|----------------|
| a 7.845 (2) | b 3.1903 (1) | c 51.542 (2) | d 5.87654 (3). |
|-------------|--------------|--------------|----------------|

4. a Share £8000 equally between 6 people.

How much can each person get ?

b Share one million pounds equally between 9 people.

How much can each person get ?

c How much will each person get if you share £10 $\frac{1}{4}$ million between 7 people ?



5. Find three places in real life where rounding to decimal places is used.

Exercise 2

Significant Figures & Rounding



1. Round each of the following to **one** significant figure :-

- | | | | |
|--------|----------|----------|---------|
| a 654 | b 9126 | c 7551 | d 2741 |
| e 14.1 | f 26.033 | g 0.0612 | h 0.96. |

2. Round each of the following to **two** significant figures :-

- | | | | |
|----------|-----------|----------|----------|
| a 5412 | b 34754 | c 54370 | d 90052 |
| e 2.7641 | f 0.07654 | g 19.517 | h 99.99. |

3. Round each of these numbers to the number of significant figures in the brackets :-
 a 7845 (2) b 31903 (1) c 34235 (2) d 4.03654 (4).


4. How many significant figures has the number 200 400 been rounded to ?

5. The attendance at a football match was reported as 43 000 (rounded to two significant figures).

What was the :-

- a maximum number of supporters at the match ?
- b minimum number of supporters ?



Exercise 3 Estimating using Significant Figures 


1. Round each number to **one significant figure** to estimate each calculation :-
 a $4531 + 235$ b $76\,854 + 390$ c $45\,632 - 3\,271$ d $332\,165 - 156\,780$
 e 98×19 f 104×48 g 385×38 h $12\,476 \times 348$
 i $297 \div 18$ j $3541 \div 82$ k $45\,621 \div 488$ l $8\,502\,345 \div 2870$.

2. Round each number to **one significant figure** to estimate each calculation :-
 a $8762 + 4307 \times 208$ b $54\,123 - 390 \times 132$
 c $869 + 5086 \div 458$ d $5802 - 783\,709 \div 22\,444$.

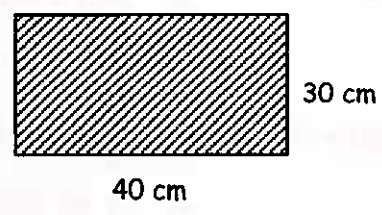
3. Round each number to **one significant figure** to estimate each calculation :-

a There are three thousand two hundred and fifty gallons of oil in an oil truck.
 How many gallons would there be in 105 trucks ?



b  Six hundred and forty eight thousand cat treats are equally shared into thirty four thousand bags.
 How many cat treats are in each bag ?

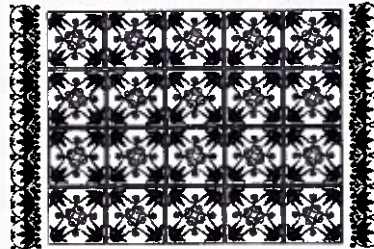
c The rectangle shown has its length and breadth rounded to one significant figure.
 Use a **calculator** to find the difference between the **maximum** and **minimum** possible areas, assuming **whole** numbers only are used.



Revisit - Review - Revise Exercise 1



1. Round each of these numbers to the number of decimal places in the brackets :-
 a 6.7513 (1) b 13.903 (2) c 49.95 (1) d 14.80552 (3).
2. Round each of these numbers to the number of significant figures in the brackets :-
 a 6543 (1) b 896575 (2) c 77.05 (1) d 11.76451 (3).
3. Round each number to one significant figure to estimate each calculation :-
 a $6512 + 7651$ b $3165 + 78$ c $5691 - 4502$ d $45713 - 16078$
 e 78×29 f 807×31 g 654×54 h 13813×789
 i $852 \div 26$ j $5514 \div 557$ k $87745 \div 341$ l $3512412 \div 2431$.
4. Rounded to one significant figure the number of carpets in a container is 8000.
 a What is the maximum number of carpets in the container?
 b What is the least number of carpets?

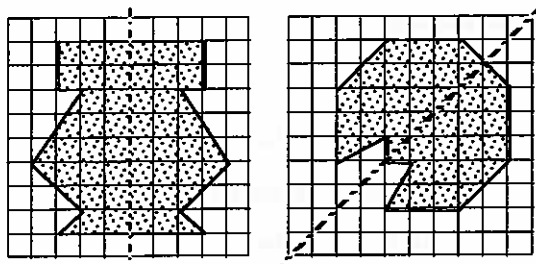


Non-Calculator Ex 1



1. Find :-
 a $147 + 387$ b $1254 - 976$ c $1205 + 9976$
 d $24124 - 9000$ e $8000 - 1754$ f 236×7
 g 1205×4 h $1685 \div 5$ i 20405×5 .
2. Calculate :-
 a 143×10 b 302×100 c 1000×165
 d $12000 \div 100$ e $10200 \div 10$ f $5 \text{ million} \div 1000$.
3. Find :-
 a 143×20 b 418×400 c 507×500
 d $42500 \div 500$ e $24600 \div 20$ f $1370000 \div 5000$.
4. Calculate :-
 a $\frac{1}{3}$ of 81 kg b $\frac{1}{5}$ of 155 m c $\frac{1}{19}$ of 1900
 d $\frac{2}{3}$ of 267°C e $\frac{2}{5}$ of £7500 f $\frac{11}{13}$ of 260 km.

63. C is best
 64. a A(3, 4) b D(4, 1)
 65. a 25% b 30
 66. $\frac{3}{8}$
 67. 0.35
 68.



3. a 15000 b 3080 c 1000 d 30000
 e 2400 f 24000 g 35000 h 8000000
 i 30 j 10 k 300 l 2000
 4. a 8499 b 7500
 5. No 11111 full packets and 1 left over

Non- Calculator Exercise 1

1. a 534 b 278 c 11181
 d 15124 e 6246 f 1652
 g 4820 h 337 i 102025
 2. a 1430 b 30200 c 165000
 d 120 e 1020 f 5000
 3. a 2860 b 167200 c 253500
 d 85 e 1230 f 274
 4. a 27 kg b 31 m c 100
 d 178°C e £3000 f 220 km

Answers to Chapter 1

Exercise 1 - Decimal Places

1. a 8.6 b 3.8 c 9.1 d 2.9
 e 11.1 f 55.0 g 0.1 h 100.0
 2. a 1.77 b 12.13 c 7.71 d 9.01
 e 3.04 f 0.02 g 99.99 h 100.00
 3. a 7.85 b 3.2 c 51.54 d 5.877
 4. a £1333.33 b £111111.11
 c £1464285.71
 5. Various

Exercise 2 - Significant Figures

1. a 700 b 9000 c 8000 d 3000
 e 10 f 30 g 0.06 h 1
 2. a 5400 b 35000 c 54000 d 90000
 e 2.8 f 0.077 g 20 h 100
 3. a 7800 b 30000 c 34000 d 4.037
 4. 4, 5 or 6
 5. a 43499 b 42500

Exercise 3 - Calculations with Significant Figures

1. a 5200 b 80400 c 47000 d 100000
 e 2000 f 5000 g 16000 h 3000000
 i 15 j 50 k 100 l 3000
 2. a 809000 b 10000
 c 910 d 5980
 3. a 300000 b 20
 c max area = $34 \times 44 = 1496 \text{ cm}^2$
 min area = $25 \times 35 = 875 \text{ cm}^2$ - diff = 621 cm^2

Review - Revisit - Revise Exercise 1

1. a 6.8 b 13.90 c 50.0 d 14.806
 2. a 7000 b 90000 c 80 d 11.8

Answers to Chapter 2

Exercise 1a - Add, Subtract, Multiply & Divide

1. a 173 b 322
 2. a 1344 b 223
 4. a 105 b 168 c 1080
 5. £16.95
 6. £1.65
 7. 5 shirts and 3 pairs of trousers

Exercise 1b - Add, Subtract, Multiply & Divide

1. a £156 b £36
 2. 12.7p each and 11.9p - 24 is better buy
 3. a Rita - £1.49, Reena - £1.53 - Rita cheaper
 b £1.60 on 40 litres
 4. a Ali - £12.45 per hour
 b Gene - £16.87 - this is £4.42 more per hour
 5. a £310 b £62 more each
 6. a £485 b 3.31% approx

Exercise 2 - Mental Exercise

1. a 111 b 190 c 421 d 10000
 e 1510 f 3460 g 1430 h 20000
 i 17 j 70 k 175 l 450
 m 6650 n 653 o 410 p 5200
 2. a 260 b 484 c 186 d 525
 e 22 f 32 g 42 h 1111
 i 320 j 732 k 9600 l 93600
 m 73 n 1005 o 877 p 280
 3. a £67200 b £340 c £900

Exercise 3 - Multiples of 10, 100, 1000

1. a 680 b 1380 c 9360 d 8240
 e 47000 f 78600 g 378700 h 2222000

FRACTIONS

Do not use a calculator. Show all working.

In questions 2 to 4 express your answers as common fractions in simplest form.

1. Evaluate:

(a) $7 \cdot 3 + 4 \cdot 9 - 6 \cdot 82$

(b) $8 \cdot 6 + 5 \cdot 7 - 6 \cdot 45$

(c) $26 \cdot 2 - 11 \cdot 5 - 7 \cdot 9$

(d) $13 \cdot 3 - 2 \cdot 9 + 4 \cdot 5$

(e) $13 \cdot 5 - 6 \cdot 2 + 1 \cdot 76$

(f) $14 \cdot 37 - 8 \cdot 7 + 3 \cdot 58$

(g) $4 \cdot 7 + 0 \cdot 36 \times 7$

(h) $5 \cdot 15 + 2 \cdot 91 \times 3$

(i) $17 \cdot 7 + 2 \cdot 72 \times 6$

(j) $64 \cdot 3 - 12 \cdot 9 \times 4$

(k) $23 \cdot 7 - 3 \cdot 42 \times 6$

(l) $(12 \cdot 8 - 7 \cdot 35) \times 9$

(m) $8 \cdot 15 + 48 \cdot 3 \div 7$

(n) $19 \cdot 85 - 12 \cdot 2 \div 5$

(o) $(9 \cdot 84 + 19 \cdot 2) \div 3$

(p) $43 \cdot 2 - 38 \cdot 7 \div 9$

(q) $34 \cdot 2 - 29 \cdot 4 \div 6$

(r) $(17 \cdot 6 - 11 \cdot 24) \div 4$

2. Evaluate:

(a) $3\frac{1}{4} + 2\frac{1}{3}$

(b) $5\frac{2}{5} + 3\frac{1}{2}$

(c) $6\frac{3}{4} + 2\frac{5}{6}$

(d) $4\frac{2}{3} + 1\frac{1}{8}$

(e) $3\frac{2}{9} + 4\frac{5}{12}$

(f) $9\frac{3}{4} - 5\frac{1}{3}$

(g) $6\frac{2}{3} - 2\frac{3}{8}$

(h) $7\frac{5}{6} - 4\frac{3}{5}$

(i) $10\frac{5}{6} - 8\frac{2}{9}$

(j) $12\frac{5}{8} - 9\frac{3}{4}$

(k) $\frac{1}{3} + \frac{3}{4} - \frac{5}{6}$

(l) $\frac{5}{8} + \frac{1}{3} - \frac{3}{4}$

(m) $3\frac{1}{2} + 2\frac{3}{4} - 1\frac{2}{3}$

(n) $2\frac{3}{4} - \frac{2}{3} + 4\frac{1}{2}$

(o) $\frac{5}{9} - \frac{2}{3} + \frac{5}{6}$

3. Evaluate:

(a) $\frac{2}{3} \times \frac{7}{8}$

(b) $\frac{3}{4}$ of $\frac{5}{6}$

(c) $\frac{5}{8} \times \frac{4}{9}$

(d) $\frac{3}{5}$ of $\frac{7}{12}$

(e) $\frac{8}{9} \times \frac{3}{4}$

(f) $\frac{4}{9} \div \frac{3}{5}$

(g) $\frac{1}{3} \div \frac{4}{9}$

(h) $\frac{1}{8} \div \frac{3}{4}$

(i) $\frac{5}{12} \div \frac{2}{3}$

(j) $\frac{4}{9} \div \frac{5}{6}$

(k) $1\frac{1}{3} \times \frac{7}{10}$

(l) $1\frac{2}{3} \times \frac{4}{5}$

(m) $5\frac{1}{3} \times 4\frac{1}{2}$

(n) $1\frac{2}{3} \times 2\frac{1}{4}$

(o) $3\frac{3}{4} \times 1\frac{1}{5}$

(p) $1\frac{1}{2} \div \frac{9}{10}$

(q) $\frac{2}{9} \div 1\frac{2}{3}$

(r) $1\frac{3}{5} \div 2\frac{2}{3}$

(s) $2\frac{2}{9} \div 3\frac{1}{3}$

(t) $3\frac{3}{5} \div 4\frac{2}{3}$

4. Evaluate:

(a) $\frac{3}{10} + \frac{2}{5} \times \frac{2}{3}$

(b) $\frac{1}{8} + \frac{3}{4}$ of $\frac{5}{6}$

(c) $\frac{5}{6} - \frac{2}{3} \times \frac{5}{8}$

(d) $\frac{4}{5} - \frac{3}{5}$ of $\frac{2}{9}$

(e) $\frac{4}{15} + \frac{3}{4} \times \frac{8}{9}$

(f) $\frac{4}{5}$ of $(\frac{7}{8} - \frac{2}{3})$

(g) $\frac{3}{5} \times (\frac{2}{9} + \frac{1}{6})$

(h) $\frac{3}{8}$ of $(\frac{7}{10} - \frac{8}{15})$

(i) $\frac{3}{4} \times (\frac{3}{8} + \frac{1}{6})$

(j) $\frac{2}{3}$ of $(\frac{3}{4} - \frac{1}{6})$

(k) $\frac{2}{9} + \frac{1}{8} \div \frac{3}{4}$

(l) $\frac{9}{10} - \frac{1}{3} \div \frac{5}{9}$

(m) $(\frac{5}{6} - \frac{3}{4}) \div \frac{2}{3}$

(n) $(\frac{2}{3} + \frac{1}{6}) \div \frac{3}{8}$

(o) $\frac{1}{3} \div (\frac{4}{5} - \frac{1}{3})$

(p) $\frac{3}{10} + \frac{1}{5} \times 2\frac{2}{3}$

(q) $4\frac{1}{2} - 1\frac{2}{3} \times \frac{3}{4}$

(r) $7\frac{1}{4} + \frac{2}{3}$ of $4\frac{4}{5}$

(s) $5\frac{2}{3} - \frac{3}{8}$ of $6\frac{2}{5}$

(t) $8\frac{3}{4} - 4\frac{2}{3} \div \frac{7}{8}$

ANSWERS

1. (a) 5.38 (b) 7.85 (c) 6.8 (d) 14.9 (e) 9.06 (f) 9.25 (g) 7.22
(h) 13.88 (i) 34.02 (j) 12.7 (k) 3.18 (l) 49.05 (m) 15.05 (n) 17.41
(o) 9.68 (p) 38.9 (q) 29.3 (r) 1.59

2. (a) $5\frac{7}{12}$ (b) $8\frac{9}{10}$ (c) $9\frac{7}{12}$ (d) $5\frac{19}{24}$ (e) $7\frac{23}{36}$ (f) $4\frac{5}{12}$ (g) $4\frac{7}{24}$ (h) $3\frac{7}{30}$
(i) $2\frac{11}{18}$ (j) $2\frac{7}{8}$ (k) $\frac{1}{4}$ (l) $\frac{5}{24}$ (m) $4\frac{7}{12}$ (n) $6\frac{7}{12}$ (o) $\frac{13}{18}$

3. (a) $\frac{7}{12}$ (b) $\frac{5}{8}$ (c) $\frac{5}{18}$ (d) $\frac{7}{20}$ (e) $\frac{2}{3}$ (f) $\frac{20}{27}$ (g) $\frac{3}{4}$ (h) $\frac{1}{6}$
(i) $\frac{5}{8}$ (j) $\frac{8}{15}$ (k) $\frac{14}{15}$ (l) $1\frac{1}{3}$ (m) 24 (n) $3\frac{3}{4}$ (o) $4\frac{1}{2}$ (p) $1\frac{2}{3}$
(q) $\frac{2}{15}$ (r) $\frac{3}{5}$ (s) $\frac{2}{3}$ (t) $\frac{27}{35}$

4. (a) $\frac{17}{30}$ (b) $\frac{3}{4}$ (c) $\frac{5}{12}$ (d) $\frac{2}{3}$ (e) $\frac{14}{15}$ (f) $\frac{1}{6}$ (g) $\frac{7}{30}$ (h) $\frac{1}{16}$
(i) $\frac{13}{32}$ (j) $\frac{7}{18}$ (k) $\frac{7}{18}$ (l) $\frac{3}{10}$ (m) $\frac{1}{8}$ (n) $2\frac{2}{9}$ (o) $\frac{5}{7}$ (p) $\frac{5}{6}$
(q) $3\frac{1}{4}$ (r) $10\frac{9}{20}$ (s) $3\frac{4}{15}$ (t) $3\frac{5}{12}$

Q1. Write the following numbers in standard form (SCIENTIFIC NOTATION):

- | | | | | | |
|----|--|----|------------|----|---------|
| a. | 800 000 | b. | 50 000 | c. | 9000 |
| d. | 7000 | e. | 30 000 000 | f. | 80 |
| g. | 700 | h. | 7500 | i. | 22 000 |
| j. | 360 000 | k. | 390 000 | l. | 450 000 |
| m. | 540 000 | n. | 24 000 | o. | 290 |
| p. | 560 000 000 | q. | 76 000 | r. | 35 000 |
| s. | 13 000 000 000 000 000 000 000 000 000 000 | | | | |

Q2. Write the following numbers in standard form :

- | | | | | | | | |
|----|------|----|--------|----|--------|----|-------|
| a. | 2840 | b. | 1563 | c. | 342 | d. | 186.3 |
| e. | 36 | f. | 29.8 | g. | 4 | | |
| h. | 265 | i. | 18 | | | | |
| j. | 3020 | k. | 58 730 | l. | 138.54 | | |

Q3. Write the following as ordinary numbers.

- | | | | | | | | |
|----|---------------------|----|--------------------|----|---------------------|----|---------------------|
| a. | 7×10^5 | b. | 8.25×10^5 | c. | 9.663×10^5 | d. | 3.45×10^2 |
| e. | 9.02×10^5 | f. | 1.2×10^3 | g. | 2.8×10^2 | h. | 8.72×10^6 |
| i. | 3.84×10^3 | j. | 8×10^4 | k. | 9.38×10^2 | l. | 7.506×10^4 |
| m. | 3.91×10^3 | n. | 6×10^3 | o. | 5.736×10^3 | p. | 4.5×10^2 |
| q. | 1.051×10^6 | r. | 2.5×10^1 | s. | 8.9×10^0 | t. | 7.32×10^9 |

Q4. Write the following numbers in standard form.

- | | | | | | | | |
|----|--------------|----|------------|----|-----------|----|-----------|
| a. | 0.56 | b. | 0.819 | c. | 0.704 | d. | 0.02 |
| e. | 0.035 | f. | 0.0601 | g. | 0.0004 | h. | 0.000 57 |
| i. | 0.000 08 | j. | 0.000 0965 | k. | 0.000 794 | | |
| l. | 0.000 0007 | | | | | | |
| m. | 0.000 008 21 | n. | 0.36 | o. | 0.091 | p. | 0.000 423 |
| q. | 0.6241 | r. | 0.0079 | s. | 0.000 805 | t. | 0.07 |
| u. | 0.62 | v. | 0.0909 | w. | 0.6040 | x. | 0.0003 |

Q5. Write the following numbers in standard form.

- | | | | | | | | |
|----|--|----|------------|----|--------|----|------|
| a. | 0.069 | b. | 0.000 0792 | c. | 0.0084 | d. | 0.68 |
| e. | 0.000 000 000 00015 | | | | | | |
| f. | 0.000 000 000 000 000 000 000 000 0082 | | | | | | |

Q6. Write the following as ordinary numbers

- | | | | |
|--------------------------|--------------------------|--------------------------|---------------------------|
| a. 2.5×10^{-3} | b. 5.01×10^{-2} | c. 4.7×10^{-3} | d. 6.37×10^{-4} |
| e. 7.3×10^{-1} | f. 2.15×10^{-2} | g. 8.5×10^{-5} | h. 7×10^{-3} |
| i. 1.5×10^{-4} | j. 6.2×10^{-1} | k. 1.38×10^{-2} | l. 2.9×10^{-5} |
| m. 3.08×10^{-2} | n. 4×10^{-3} | o. 5.86×10^{-1} | p. 1.3×10^{-4} |
| q. 2.04×10^{-6} | r. 6.1×10^{-1} | s. 2.5×10^{-9} | t. 9.02×10^{-12} |

Q7. Rewrite these sentences with the numbers written out in full

- The speed of light is 3×10^8 metres per second.
- The diameter of the earth is 1.268×10^4 kilometres.
- A Building Society has $\pounds 2.15 \times 10^9$ in its funds.
- The radius of the orbit of an electron is 5×10^{-8} mm.
- A space probe reached a speed of 1.49×10^5 m.p.h.
- The earth weighs 6.6×10^{21} tonnes.
- A film of oil is 8×10^{-7} mm thick.

Q8. Here are some daily newspapers from around the world and their approximate circulation figures. Rewrite the circulation figures using standard form.

Newspaper	Country	Circulation
Bild	Germany	4 416 000
Canberra Times	Australia	44 000
Daily Mail	UK	1 702 000
Komsomolskaya Pravda	Russia	20 354 000

Q9. Given below are some radioactive isotopes and their half-lives.

isotope	half-life
lithium-5	4.4×10^{-22} seconds
polonium-213	4.2×10^{-6} seconds
lead-211	36 minutes
lead-209	3.3 hours

Write in full the half-life for a. polonium b. uranium c. thorium

Q10. Use your calculator to answer the following, giving your answers in Standard Form.

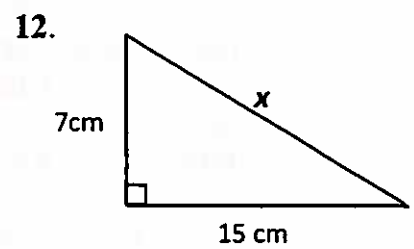
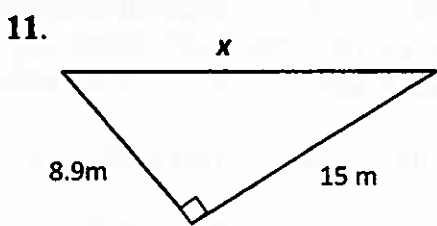
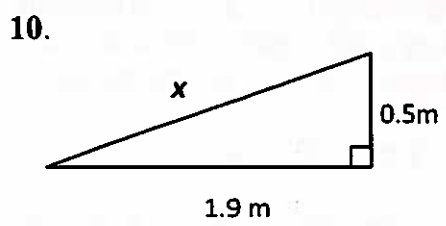
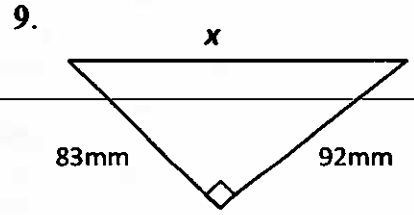
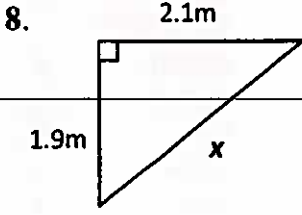
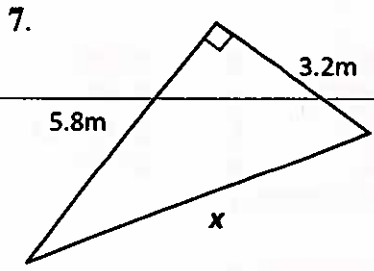
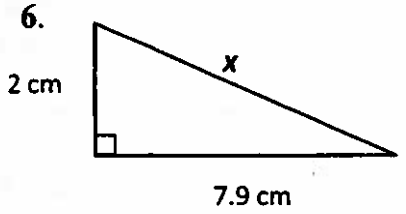
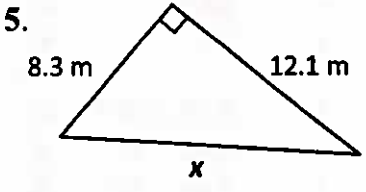
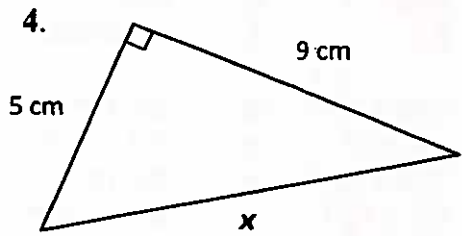
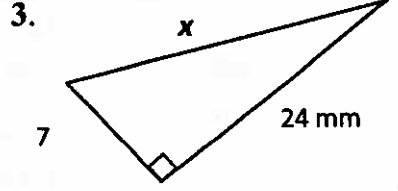
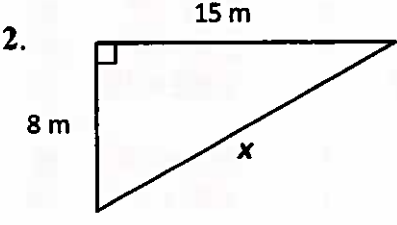
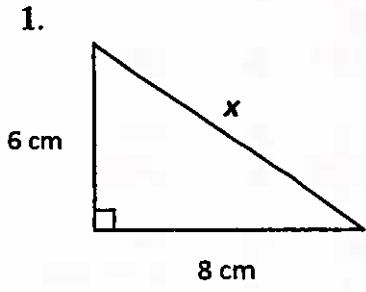
- | | | | |
|----|--|----|---|
| a. | $(2.2 \times 10^5) \times (4 \times 10^6)$ | b. | $(3.15 \times 10^7) \times (2.2 \times 10^8)$ |
| c. | $(1.8 \times 10^3) \times (2.3 \times 10^4)$ | d. | $(9.1 \times 10^6) \times (1.5 \times 10^{12})$ |
| e. | $(1.4 \times 10^{13}) \times (4.9 \times 10^{11})$ | f. | $(2.3 \times 10^5) \times (2.4 \times 10^7)$ |
| g. | $(4.25 \times 10^4) \times (2.8 \times 10^2)$ | h. | $(1.95 \times 10^{-8}) \times (3.2 \times 10^9)$ |
| i. | $(8.7 \times 10^5) \times (7.3 \times 10^{-10})$ | j. | $(5.05 \times 10^{-21}) \times (1.8 \times 10^{-17})$ |
| k. | $(2.2 \times 10^{15}) \div (4 \times 10^8)$ | l. | $(3.15 \times 10^4) \div (5 \times 10^{13})$ |
| m. | $(1.8 \times 10^{23}) \div (2.4 \times 10^7)$ | n. | $(1.302 \times 10^{14}) \div (1.4 \times 10^8)$ |
| o. | $(1.131 \times 10^{18}) \div (8.7 \times 10^{10})$ | p. | $(8.25 \times 10^5) \div (3.3 \times 10^{-7})$ |
| q. | $(4.25 \times 10^{-14}) \div (2.5 \times 10^{-5})$ | r. | $(8.82 \times 10^{-22}) \div (6.3 \times 10^{11})$ |
| s. | $(9.167 \times 10^4) \div (1.03 \times 10^{-4})$ | t. | $(6.846 \times 10^{34}) \div (6.52 \times 10^{15})$ |

Standard Form

Q1.	a.	8×10^5	b.	5×10^4	c.	9×10^3	d.	7×10^3
	e.	3×10^7	f.	8×10^1	g.	7×10^2	h.	7.5×10^3
	i.	2.2×10^4	j.	3.6×10^5	k.	3.9×10^5	l.	4.5×10^5
	m.	5.4×10^5	n.	2.4×10^4	o.	2.9×10^2	p.	5.6×10^8
	q.	7.6×10^4	r.	3.5×10^4	s.	1.3×10^{28}		
Q2. 10^2	a.	2.84×10^3	b.	1.563×10^3	c.	3.42×10^2	d.	$1.863 \times$
	e.	3.6×10^1	f.	2.98×10^1	g.	4×10^0	h.	2.65×10^2
	i.	1.8×10^1	j.	3.02×10^3	k.	5.873×10^4	l.	$1.3854 \times$
Q3. 10^2	a.	70 000	b.	825 000	c.	966 300	d.	345
	e.	902 000	f.	1200	g.	280	h.	8 720 000
	i.	3840	j.	80000	k.	938	l.	75 060
	m.	3910	n.	6000	o.	5736	p.	450
	q.	1 051 000	r.	25	s.	8.9	t.	7 320 000
Q4. 000	a.	5.6×10^{-1}	b.	8.19×10^{-1}	c.	7.04×10^{-1}	d.	2×10^{-2}
	e.	3.5×10^{-2}	f.	6.01×10^{-2}	g.	4×10^{-4}	h.	5.7×10^{-4}
	i.	8×10^{-6}	j.	9.65×10^{-5}	k.	7.94×10^{-4}	l.	7×10^{-7}
	m.	8.21×10^{-6}	n.	3.6×10^{-1}	o.	9.1×10^{-2}	p.	4.23×10^{-4}
	q.	6.241×10^{-1}	r.	7.9×10^{-3}	s.	8.05×10^{-4}	t.	7×10^{-2}
	u.	6.2×10^{-1}	v.	9.09×10^{-2}	w.	6.04×10^{-1}	x.	3×10^{-4}
	Q5.	a.	6.9×10^{-2}	b.	7.92×10^{-5}	c.	8.4×10^{-3}	d.
Q6.	e.	1.5×10^{-13}	f.	8.2×10^{-27}				
	a.	0.0025	b.	0.0501	c.	0.0047	d.	0.000637
	e.	0.73	f.	0.0215	g.	0.000085	h.	0.007
	i.	0.00015	j.	0.62	k.	0.0138	l.	0.000029
	m.	0.0308	n.	0.004	o.	0.586	p.	0.00013
Q7.	q.	0.00000204	r.	0.61	s.	0.0000000025	t.	
	a.	300 000 000	b.	12680	c.	2150 000 000	d.	
	e.	149 000	f.	6 600 000 000 000 000 000 000	g.	0.0000008		
Q8.	$4.416 \times 10^6, 4.4 \times 10^4, 1.702 \times 10^6, 2.0354 \times 10^7, 4.29 \times 10^5, 1.687 \times 10^6, 4.08 \times 10^5$							
Q9. yrs	a.	0.0000042 secs	b.	4 551 000 000 yrs	c.	13 900 000 000		
Q10. 10^{19}	a.	8.8×10^{11}	b.	1.54×10^9	c.	4.14×10^7	d.	$1.365 \times$
	e.	6.86×10^{24}	f.	5.52×10^{12}	g.	1.19×10^7	h.	6.24×10^1
	i.	6.351×10^{-4}	j.	9.09×10^{-38}	k.	5.5×10^6	l.	6.3×10^{-10}
	m.	7.5×10^{15}	n.	9.3×10^5	o.	1.3×10^7	p.	2.5×10^{12}
	q.	1.7×10^{-9}	r.	1.4×10^{-33}	s.	8.9×10^8	t.	1.05×10^{19}

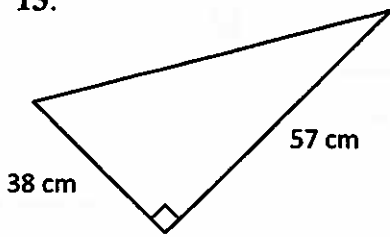
Pythagoras 1

Find the length of the hypotenuse, marked x , in each of the following triangles.

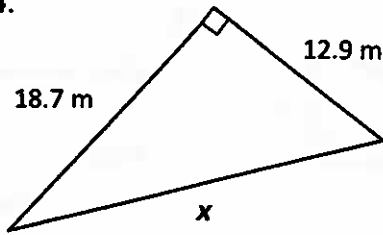


x

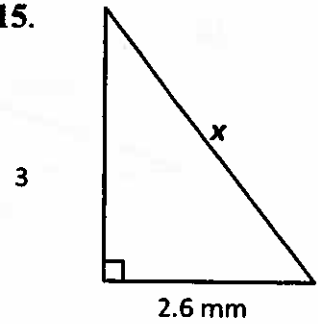
13.



14.



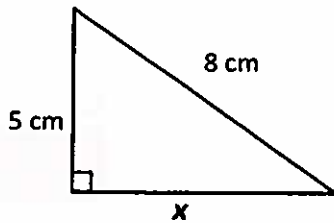
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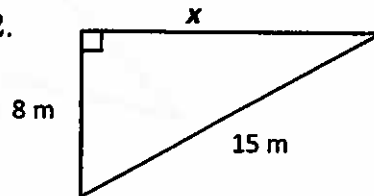
Pythagoras 2

Find the length of the missing side, marked x , in each of the following triangles.

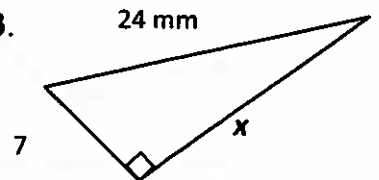
1.



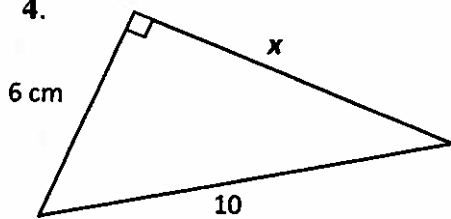
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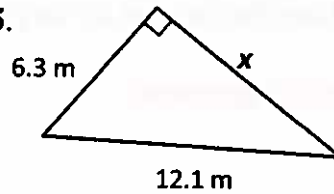
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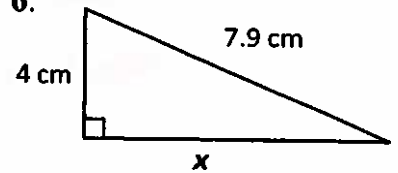
4.



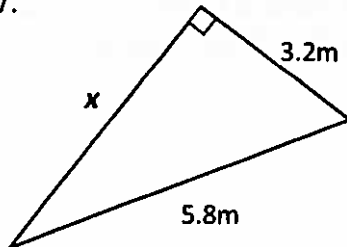
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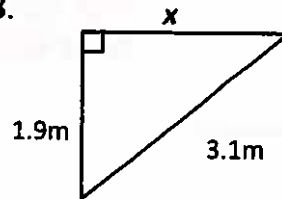
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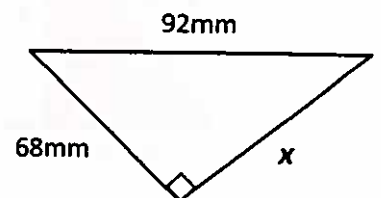
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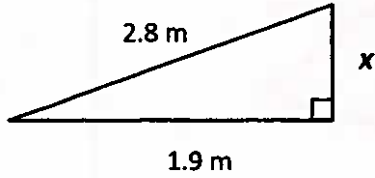
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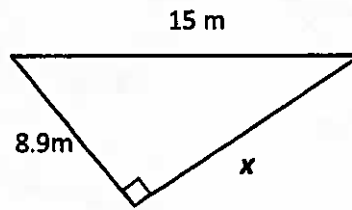
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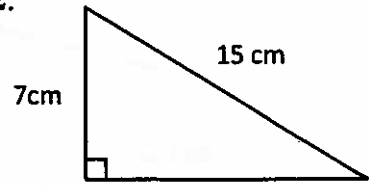
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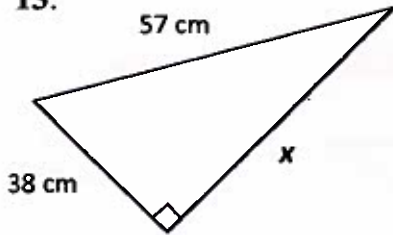
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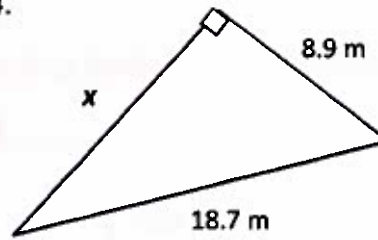
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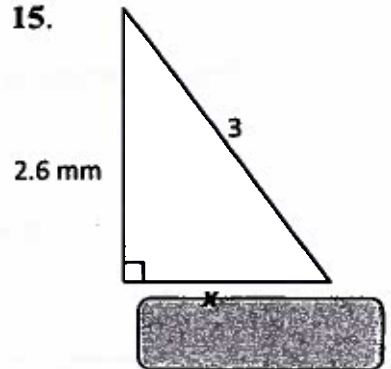
13.



14.



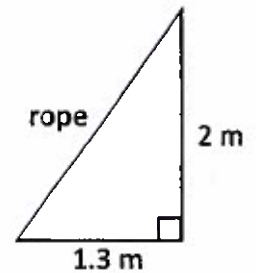
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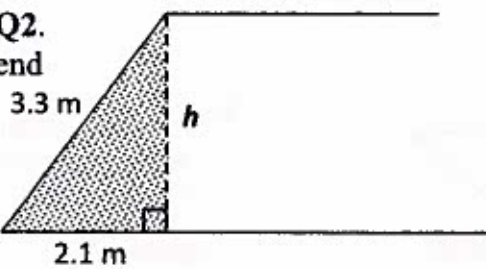
Pythagoras 3

Q1. Guy ropes are used to support a tent pole. The pole is 2 metres high and the guy rope is fixed 1.3 metres from the bottom of the pole.

What is the length of the guy rope?

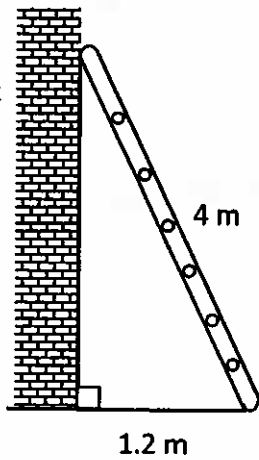


Q2.
end



Jim's house has an attic room with a sloping wall. He is going to make a fitted cupboard. What will be the height of the cupboard, h .

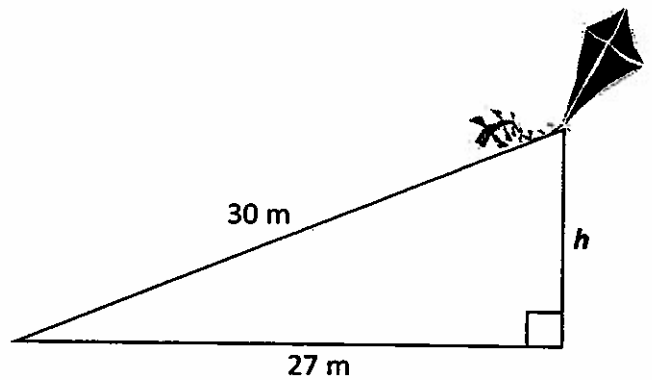
Q3.
the foot



John's ladder is 4 metres long. He sets it up so that of the ladder is 1.2 metres from the wall.

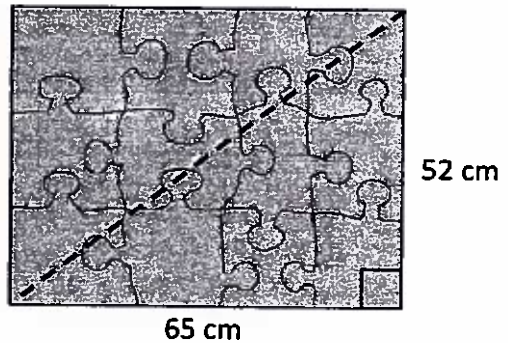
How far up the wall will the ladder reach?

Q4. Eddie is flying his kite. He lets out 30 metres of string and moves 27 metres from his starting point. How high is the kite above the ground?



Q5. A rectangular jigsaw measures 65 cm by 52 cm.

What length is its diagonal?



Pythagoras 1

- Q1. 10 Q2. 17 Q3. 25 Q4. 10.3 Q5. 14.7 Q6. 8.1 Q7.
6.6
Q8. 2.8 Q9. 124 Q10. 2.0 Q11. 17.4 Q12. 16.6 Q13. 68.5
Q14. 22.7
Q15. 4.0

Pythagoras 2

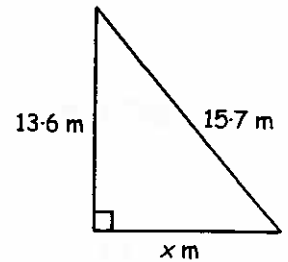
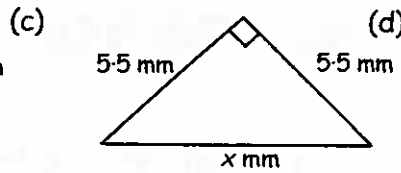
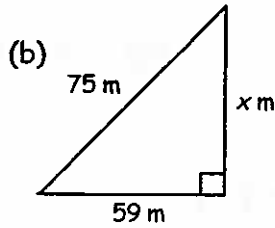
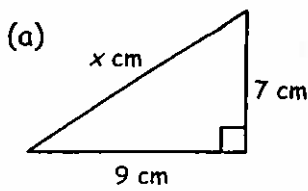
Q1. 6.2 Q2. 12.7 Q3. 23.0 Q4. 6.7 Q5. 10.3 Q6. 6.8 Q7.
4.8
Q8. 2.4 Q9. 62.0 Q10. 1.6 Q11. 12.1 Q12. 13.3 Q13. 42.5
Q14. 16.4
Q15. 1.5

Pythagoras 3

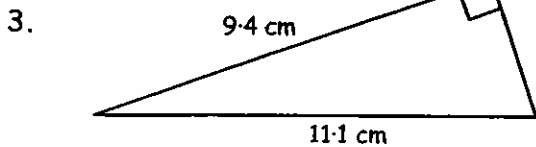
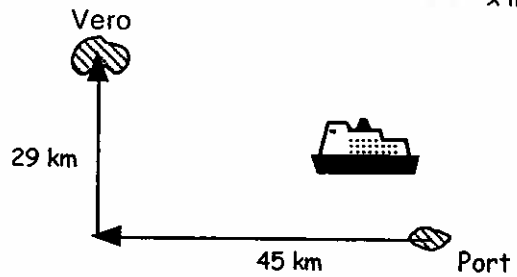
Q1. 2.4 m Q2. 2.5 m Q3. 3.8 m Q4. 13.1 m Q5. 83.2 cm

Pythagoras.

1. Calculate the length of the missing side in each triangle to 1 decimal place.

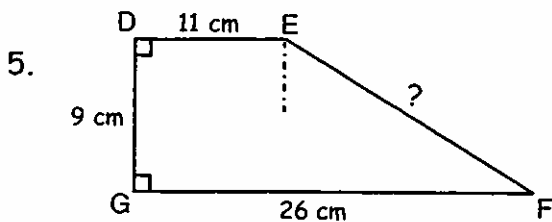
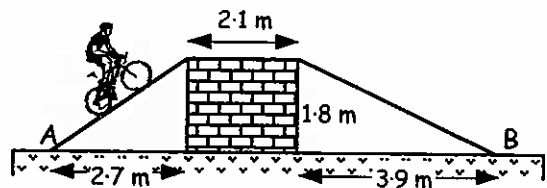


2. A ferry sailed 45 km due West from port. It then sailed 29 km due North to Vero Island. How far is the ferry now from port ?



Calculate the perimeter of this right angled triangle.

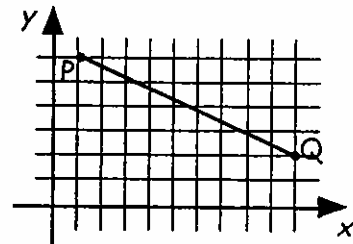
4. A cycling ramp is built up, along and down a wall. Calculate the TOTAL distance along the ramp from A to B ?



A trapezium is drawn with two parallel horizontal sides DE and GF. GD is a vertical line.

Calculate the length of the sloping side EF.

6. (a) In this diagram P is the point (1, 6) and Q is (10, 2). Calculate the length of the line PQ.



(b) Draw a new set of axes and plot the 2 points M(3,-4) and N(8, 4). Calculate the length of the line MN.

Pythagoras answer:

1(a) 11.4cm (b) 46.3cm (c) 7.8mm

(d) 7.8m

2. 63.51cm

3. 26.4cm (4) 9.6m

5. 17.5cm

6(a) 9.8 (b) 9.4

Tidying up terms.

1. Simplify :-

- (a) $3x + 2x$
 (d) $t + 5t + 8t$
 (g) $5r + r - 3r$

- (b) $8m + m$
 (e) $6x - 6x$
 (h) $r + r + r + r$

- (c) $12a - a$
 (f) $8t - t$
 (i) $8b - 7b + 5b$

2. Simplify :-

- (a) $2a + 3b + 5a$
 (d) $10t + 5 - 3t + 8$
 (g) $a + b + 2a - b$

- (b) $9m + 2n - 3m + 5n$
 (e) $8a + 5 - 8a + 4$
 (h) $3x + 5y - 5y - 3x$

- (c) $12a + 11b - 2a - 5b$
 (f) $2t + 5 + 3t - 5$
 (i) $10r + t - 3r + 2t$

3. Multiply out the brackets :-

- (a) $2(x + 3)$
 (d) $3(5p - 2)$
 (g) $2(6x + 8)$

- (b) $4(x - 2)$
 (e) $2(3a + 5b)$
 (h) $3(12y - 9)$

- (c) $5(3m + 2n)$
 (f) $8(4t + 5s)$
 (i) $4(24x + 16)$

4. Multiply out and tidy up :-

- (a) $5(x + 2) + 3x - 6$
 (d) $3(4x + 1) + 2(5 - 6x)$

- (b) $2(3x + 5) + 3(x + 2)$
 (e) $8a + 4 + 2(3a - 2)$

- (c) $10x + 4(8 - 2x)$
 (f) $10x + 2(x - 3) + 7$

Equations and Inequations.

1. Solve for x :- (Show all your working)

- (a) $x + 3 = 7$
 (d) $13 = x - 1$
 (g) $7x = 105$

- (b) $x + 5 = 5$
 (e) $5x = 30$
 (h) $3x = -15$

- (c) $x + 8 = 3$
 (f) $4x = 30$
 (i) $2x = 6$

2. Solve for x :-

- (a) $3x + 1 = 16$
 (d) $6x + 3 = 3$

- (b) $2x - 1 = 11$
 (e) $8x - 4 = 0$

- (c) $7x - 1 = 69$
 (f) $3x - 1 = 0$

3. Solve for x :-

- (a) $4x - 1 = 2x + 7$
 (d) $8x = 6x + 10$

- (b) $7x - 3 = 2x + 17$
 (e) $12x + 2 = 7x + 34$

- (c) $1 + 9x = x + 33$
 (f) $9x - 12 = 3x$

4. Solve for x :-

- (a) $3(x + 5) = 21$
 (d) $4(2x - 5) = 44$

- (b) $5(x - 1) = 30$
 (e) $3(2 + x) = 33$

- (c) $2(3x + 5) = 52$
 (f) $4(x - 2) = 2x$

5. For each of these :-

(i) Solve the inequality.

(ii) Write down all the solutions from the set of numbers.

 $\{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$.

- (a) $x - 3 < 2$
 (d) $4x + 11 > 43$

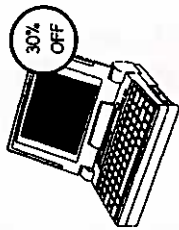
- (b) $3x \leq 15$
 (e) $5x - 2 < 3$

- (c) $2x + 1 < 3$
 (f) $3x - 20 \geq 10$

Percentages

- Calculate :-
 (a) 15% of £120 (b) 9% of £46 (c) 17½% of £1600 (d) 7.2% of £90.
- (a) A man earns £18 500 per year. He receives a 3% increase. How much will he now be earning per year?
 (b) In a sale, there is a "30% reduction on everything". What is the sale price of a laptop which should have cost £490?
- Express :-
 (a) £60 as a percentage of £80.
 (b) £6.40 as a percentage of £8.
- A shopkeeper buys a washing machine for £240. He sells it for £312.
 (a) Calculate his profit.
 (b) Express the profit as a fraction of what it cost him.
 (c) Change this to a percentage.

SALE



Volume

- This fish tank is made with plastic strips and 6 sheets of perspex. Calculate :-
 (a) The total length of plastic strip needed.
 (b) The total surface area of the perspex.
 (c) The volume of water it holds. (answer in litres).
- Calculate the volumes of these prisms :-
 (a) Area = 8 cm², Height = 11 cm
 (b) Area = 15 cm², Height = 13 cm
 (c) Area = 8.2 cm², Height = 20 cm
- This is a triangular prism.
 (a) Calculate the area of the shaded face.
 (b) Calculate the volume of the prism.
- Calculate the volumes of these tents in m³.
 (a) Area = 1.5 m², Length = 3 m
 (b) Area = 2.25 m², Length = 2.5 m

ANSWERS

- Pythagoras**
- (a) 11.4 cm (b) 46.3 m (c) 7.8 mm (d) 7.8 m
 - 53.5 km 3. 26.4 cm 4. 9.6 m
 - 17.5 cm 6. (a) 9.8 (b) 9.4
- Tidying up terms**
- (a) 5x (b) 9m (c) 11a (d) 14t (e) 0
 (f) 7t (g) 3r (h) 4r (i) 6b.
 - (a) 7a + 3b (b) 6m + 7n (c) 10a + 6b (d) 7t + 13 (e) 9
 (f) 5t (g) 3a (h) 0 (i) 7r + 3t.
 - (a) 2x + 6 (b) 4x - 8 (c) 15m + 10n (d) 15p - 6 (e) 6a + 10b
 (f) 32t + 40s (g) 12x + 16 (h) 36y - 27 (i) 96x + 64
 - (a) 8x + 4 (b) 9x + 16 (c) 2x + 32 (d) 13
 (e) 14a (f) 12x + 1.
- Equations & Inequalities**
- (a) 4 (b) 0 (c) -5 (d) 14 (e) 6
 (f) 7½ (g) 15 (h) -5 (i) 3
 - (a) 5 (b) 6 (c) 10 (d) 0
 - (a) 4 (b) 4 (c) 4 (d) 5
 (e) 6½ (f) 2
 - (a) 2 (b) 7 (c) 7 (d) 8
 (e) 9 (f) 4
 - (a) x < 5 (0, 1, 2, 3, 4) (b) x ≤ 5 (0, 1, 2, 3, 4, 5)
 (c) x < 1 (0) (d) x > 8 (9, 10)
 (e) x < 1 (0) (f) x ≥ 10 (10)
- Circles 1**
- (a) 25.12 cm (b) 18.84 cm (c) 16.96 cm (d) 37.68 cm
 - (a) 50 cm (b) 25.48 cm
 - (a) 23.13 cm (b) 51.4 cm (c) 16.07 cm (d) 48.8 cm
 - (a) 37.68 metres (b) (i) 133 turns (ii) 3318 turns
 - (a) 2 m (b) 36.28 m (c) £96.14
- Circles 2**
- (a) 314 cm² (b) 55.39 m²
 - (a) 157 cm² (b) 38.47 cm² (c) 49.12 cm² (d) 3462.5 m²
 - (a) 447.84 cm² (b) 53.86 cm² (c) 136.83 cm²

Chapter 43

Equations & Inequalities

Exercise 1



1. Copy each equation and solve it to find the value of x :-

(a) $x + 9 = 15$

(b) $x + 11 = 11$

(c) $x - 8 = 4$

(d) $x - 18 = 0$

(e) $x - 60 = 20$

(f) $x + 8 = 3$

(g) $x + 19 = 0$

(h) $3 + x = 5$

(i) $22 + x = 1$.

2. Copy each equation and solve it to find the value of the letter :-

(a) $2m = 26$

(b) $7k = 0$

(c) $4x = 2$

(d) $8u = 12$

(e) $8v = 18$

(f) $15p = 10$.

3. Find the value of x in the following equations (*Show each step of working carefully*).

(a) $4x + 1 = 21$

(b) $3x + 5 = 29$

(c) $9x - 3 = 15$

(d) $7x - 6 = 29$

(e) $6x - 12 = 0$

(f) $5x - 1 = 44$

(g) $9x - 20 = 34$

(h) $3x + 42 = 87$

(i) $2x - 7 = 32$

(j) $9x + 9 = 0$

(k) $2x - 19 = 0$

(l) $3x + 5 = -7$.

Exercise 2



1. Solve the following equations :-

(a) $5x + 3 = 3x + 5$

(b) $8x + 9 = 7x + 17$

(c) $7x - 1 = 3x + 15$

(d) $5x - 3 = 2x + 18$

(e) $12x - 5 = 8x + 7$

(f) $10x - 1 = 8x + 6$

(g) $6x + 4 = 3x + 4$

(h) $9x - 1 = 4x + 34$

(i) $7x - 8 = x + 1$.

2. Solve for x :-

(a) $4x = 3x + 8$

(b) $4x = x + 18$

(c) $9x = 4x + 45$

(d) $10x = 9x + 41$

(e) $3x = x + 17$

(f) $5x - 26 = 3x$

(g) $7x - 48 = x$

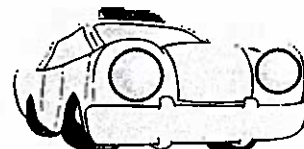
(h) $3x + 17 = x$

(i) $10x - 30 = 6x$.

3. Simon had 6 boxes of disks.
Amy had only 1 box of disks but had 50 loose disks as well.
They discovered that they had exactly the same number of disks.



- (a) Make up an equation to show this information.
(let x be the number of disks in 1 box)
- (b) Solve the equation to determine how many disks there are in each box.
4. A large group of friends decide to go to a football match.
They fill 6 taxis and 4 of them also to walk to the match.
Afterwards, they have 4 taxis (full) to take them back.
The remaining 16 friends walk home.



- (a) Make up an equation to show this information.
(let x be the number of people in 1 full taxi)
- (b) Solve the equation to determine how many people a full taxi carried.



Exercise 3

1. Solve these equations by multiplying out the brackets first :-

(a) $2(x + 7) = 18$	(b) $3(x + 4) = 30$	(c) $5(x - 6) = 10$
(d) $4(x + 9) = 48$	(e) $6(x + 3) = 66$	(f) $2(x + 5) = 18$
(g) $9(x - 4) = 36$	(h) $9(x + 1) = 9$	(i) $2(x - 1) = 11$
(j) $5(x - 7) = 0$	(k) $3(x - 8) = 9$	(l) $5(x + 7) = 20$

2. Solve these equations :-

(a) $2(4x + 3) = 14$	(b) $5(2x - 1) = 45$	(c) $3(6x - 1) = 33$
(d) $2(7x + 4) = 50$	(e) $3(2x - 8) = 0$	(f) $4(5x - 8) = 88$
(g) $2(3x - 1) = 4x + 14$	(h) $5(2x + 1) = 7x + 14$	(i) $3(1 + 2x) = 5x + 17$
(j) $6(2x - 1) = 10x$	(k) $14(2x - 1) = 26x + 4$	(l) $8(x + 3) = 7x$

3. Solve the equations :-

(a) $2(x + 5) - x - 4 = 7$	(b) $4(x + 2) + 3x - 3 = 12$
(c) $5(x + 2) - 3x = 18$	(d) $3(x - 5) + 4x + 1 = 28$
(e) $2x + 1 + 3(x - 6) = 23$	(f) $8x + 2(x - 9) = 82$
(g) $3(x - 3) + 2(x + 5) = 21$	(h) $5(2x + 1) + 3(1 - 2x) = 20$
(i) $5(2x + 1) - 2(x - 2) = 6x + 13$	(j) $10(x + 3) - 6(x + 1) = 2x + 40$

Exercise 4



Solve each of these equations, by first of all multiplying every term by the l.c.m. of all the fractional denominators :-

1. $\frac{1}{2}x - 3 = 1$

2. $\frac{1}{4}x + 7 = 10$

3. $\frac{1}{8}x - 5 = 0$

4. $\frac{2}{3}x - 1 = 9$

5. $1 + \frac{3}{5}x = 13$

6. $\frac{3}{8}x + 4 = 4$

7. $\frac{3}{4}x - \frac{1}{2} = 7$

8. $\frac{1}{2}x + \frac{1}{3} = 4$

9. $\frac{4}{5}x - \frac{1}{4} = 0$

10. $\frac{1}{2}x - 5 = \frac{1}{4}$

11. $\frac{2}{3}x - 1 = \frac{1}{6}$

12. $\frac{3}{4}x - 1 = \frac{1}{5}$

13. $\frac{1}{2}x + 1 = \frac{1}{3}x + 4$

14. $\frac{3}{4}x - 4 = \frac{3}{5}x - 1$

15. $1 + \frac{5}{8}x = \frac{1}{4}x + 10.$

Exercise 5



Multiply each term by the l.c.m. of the denominators to dispose of the fractions and solve :-

1. $\frac{x + 1}{4} = 3$

2. $\frac{x + 4}{5} = 4$

3. $\frac{x + 2}{3} - 2 = 5$

4. $8 - \frac{x - 5}{3} = 0$

5. $\frac{2}{3}(6x + 3) - 22 = 0$

6. $\frac{3}{4}(5x - 1) - 7 = 3\frac{1}{2}$

7. $\frac{5}{8}(x + 3) - \frac{1}{2}x = 2$

8. $\frac{2}{5}(6x - 1) - \frac{1}{3}x = 12$

9. $2 + \frac{3}{10}(2x + 6) = \frac{1}{3}x + 7$

10. $\frac{2}{3}(2x + 4) + \frac{1}{2}(x - 3) = 14$

11. $\frac{x - 1}{5} + \frac{x + 2}{3} = 1$

12. $\frac{2x - 1}{4} - \frac{x + 6}{3} = 0.$

Exercise 6



1. Solve these inequalities, leaving your answers in the form $x < 1$, etc. :-
 - (a) $x + 4 > 7$
 - (b) $x + 8 < 14$
 - (c) $x - 9 \leq 20$
 - (d) $x + 6 \geq 23$
 - (e) $x - 15 \leq 15$
 - (f) $x - 61 \geq 0$

2. Solve each inequality, leaving your answers in the form $x \geq 7$, etc. :-
 - (a) $5x < 25$
 - (b) $4x > 28$
 - (c) $3x < 39$
 - (d) $9x \geq 54$
 - (e) $7x \leq 98$
 - (f) $100x > 1400$

3. Solve the following inequalities :-
 - (a) $3x + 5 < 23$
 - (b) $2x + 11 > 27$
 - (c) $6x - 8 < 4$
 - (d) $7x + 3 \geq 52$
 - (e) $10x - 9 \leq 81$
 - (f) $5x - 23 > 7$
 - (g) $4x + 4 \leq 4$
 - (h) $3x - 2 < 25$
 - (i) $2x + 5 \leq 22$
 - (j) $2(x + 5) < 16$
 - (k) $4(x + 8) > 40$
 - (l) $4(x - 1) \geq 20$
 - (m) $4(2x + 1) \leq 84$
 - (n) $2(6x - 4) > 4$
 - (o) $5(x + 3) < 3x + 21$
 - (p) $3(2x - 7) \geq 5x + 19$
 - (q) $2(8x + 1) < 3x + 2$
 - (r) $7(2x - 1) \leq 12x$



Revision Exercise



1. Find the value of x in the following equations (*Show each step of working carefully*).
- | | | |
|-----------------------|------------------------|--------------------|
| (a) $x + 5 = 19$ | (b) $x - 40 = 10$ | (c) $9x = 54$ |
| (d) $2x = 17$ | (e) $10x = 5$ | (f) $4x + 1 = 21$ |
| (g) $9x - 6 = 30$ | (h) $2x + 7 = 14$ | (i) $3x - 2 = -11$ |
| (j) $5x + 1 = 3x + 7$ | (k) $7x - 1 = 4x + 14$ | (l) $9x = 3x + 42$ |
2. Don had 9 packets of toffos. He gave 2 packets to Emma, who also had 25 loose toffos.
They discovered that they then had exactly the same number of toffos.
- (a) Make up an equation to show this information.
(*let x be the number of toffos in 1 packet*)
- (b) Solve the equation to determine how many toffos there are in each packet.
3. Solve these equations :-
- | | |
|--------------------------|---------------------------------|
| (a) $3(x + 5) = 36$ | (b) $8(x - 3) = 40$ |
| (c) $2(3x + 1) = 38$ | (d) $9(2x - 8) = 0$ |
| (e) $5(3x - 2) = 5x$ | (f) $8(2x - 1) = 4x + 16$ |
| (g) $8(x + 2) - 6x = 21$ | (h) $5(2x - 1) + 3(1 + x) = 37$ |
4. Multiply each term by the l.c.m. of the denominators to dispose of the fractions and solve :-
- | | |
|-------------------------------|--|
| (a) $\frac{1}{2}x - 5 = 4$ | (b) $\frac{1}{2}x + \frac{1}{3} = 3$ |
| (c) $\frac{x + 2}{5} - 2 = 0$ | (d) $\frac{x - 1}{4} - \frac{x + 1}{10} = 1$ |
5. Solve the following inequalities :-
- | | | |
|------------------------------|--------------------------|-------------------------|
| (a) $x + 8 > 11$ | (b) $x - 12 \leq 12$ | (c) $x - 32 \geq 0$ |
| (d) $4x < 64$ | (e) $2x + 18 > 24$ | (f) $3(2x + 1) \leq 33$ |
| (g) $3(2x - 4) \geq 5x + 17$ | (h) $2(3x + 1) < 4x - 2$ | (i) $6(2x - 4) \leq 9x$ |

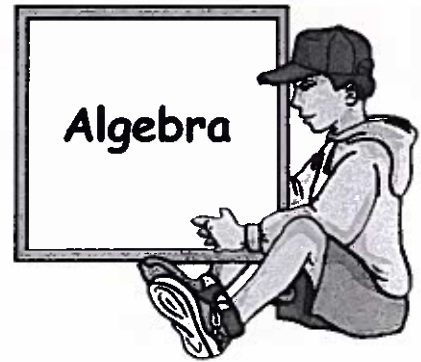
Answers to Chapter 43 (page 178)

1. (a) 5 (b) 19 (c) 0
(d) 10 (e) 6 (f) 7
(g) 1 (h) 4 (i) -3
2. (a) 6 (b) 5 (c) 8
(d) 1 (e) 4 (f) 9
(g) 6 (h) -3 (i) -4
(j) -6 (k) -2 (l) -2
3. (a) $4x = 2x + 6$ (b) 3
4. (a) 4 (b) 1 (c) 1
(d) 2 (e) 5 (f) 2
(g) 3 (h) 2 (i) -1
(j) 2 (k) 0
5. (a) 12 (b) 12 (c) 24
(d) 6 (e) $-18\frac{1}{3}$ (f) 24
(g) 32 (h) $25\frac{3}{5}$ (i) $5\frac{5}{6}$
(j) 39 (k) 3 (l) 14
6. (a) $x > 5$ (b) $x < 16$ (c) $x \leq 6$
(d) $x < 8$ (e) $x > 4$ (f) $x < 7$
(g) $x < 3$ (h) $x \geq 2$ (i) $x \leq 8$
(j) $x \leq 2$ (k) $x > 1$ (l) $x \leq \frac{1}{4}$

Answers to Chapter 47 (page 192)

1. (a) 60 km (b) 40 mph (c) 1hr 30 min
2. (a) 0.2 hr (b) 0.05 hr (c) 2.8 hr (d) 2.9 hr
3. (a) 36 mins (b) 9 mins (c) 3 hr 42 mins (d) 1 hr 27 mins
4. (a) 10 km/hr (b) Jay - 2hr 51 min Faye - 2hr 42 min Jay by 9 min
5. (a) 1230 (b) 12 km (c) 8 km/hr (d) 45 mins
(e) 15 min (f) 48 km/hr (g) 1 hour

CHAPTER 7

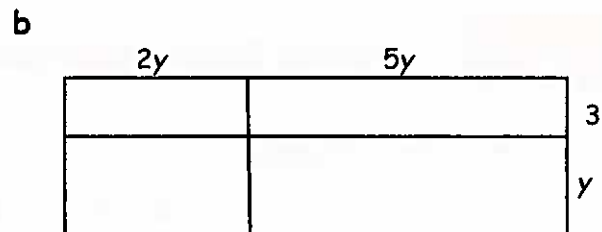
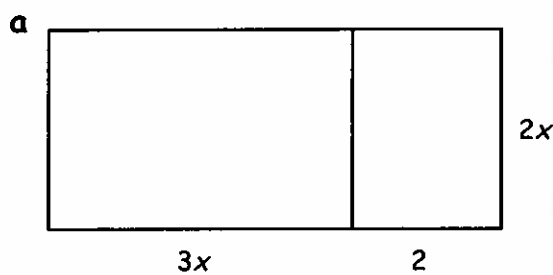


Exercise 1 Simplifying

1. Simplify each expression by collecting like terms :-

- | | | | | | | | |
|---|---------------|---|----------------|---|-------------------------|---|---------------------------|
| a | $y + y + y$ | b | $t + 3t - 2t$ | c | $3p + 5p + p$ | d | $4k + 9k - 4k$ |
| e | $2w + 6w + 3$ | f | $7u + 3 - 6u$ | g | $8y + 4b + 3y - 2b + 7$ | | |
| h | $3 \times 4y$ | i | $6k \times 7$ | j | $16p \div 2$ | k | $24w \div 8$ |
| l | $a \times 3b$ | m | $2v \times 3v$ | n | $2ab \times 3a$ | o | $3cd \times 4c \times 2d$ |
| p | $18p \div 3p$ | q | $6k^2 \div 3k$ | r | $40g^2 \div 8g^2$ | s | $4t \times 6t \div 8t$ |

2. Find the total area of each large rectangle in terms of x and y :-



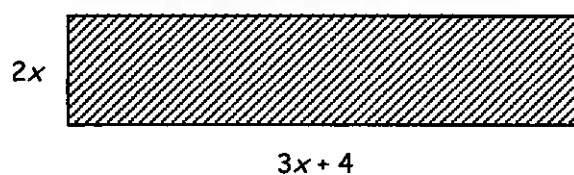
Exercise 2 Breaking Brackets

1. Multiply out each bracket :-

- | | | | | | | | |
|---|-------------|---|--------------|---|---------------|---|---------------|
| a | $3(x + 4)$ | b | $7(y - 3)$ | c | $5(2k + 5)$ | d | $11(6y - 7)$ |
| e | $y(y + 2)$ | f | $k(k - 3)$ | g | $u(3u + 4)$ | h | $3r(3r - 4)$ |
| i | $-3(q + 5)$ | j | $-4(2t + 6)$ | k | $-5(j - 2)$ | l | $-2(3f - 8)$ |
| m | $-y(y + 7)$ | n | $-h(h - 3)$ | o | $-2w(2w + 1)$ | p | $-5k(3 - 4k)$ |

2. Write down the area and perimeter of this rectangle :-

- a using brackets
b without brackets.



Exercise 3**Breaking Brackets and Simplifying**

1. Multiply out the brackets and simplify fully where necessary :-

a $5(k + 2) + 3$

b $8(2y + 4) - 12$

c $7(3e - 2) + 11$

d $8 + 2(t + 3)$

e $11 - 3(3 + w)$

f $15 - (g + 15)$

g $3(w - 1) + 2(w + 1)$

h $4(2y - 3) + 5(4y + 3)$

i $2(4r + 3) - 6$

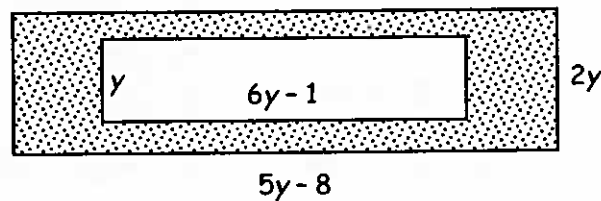
j $3w - (w + 4) + 2(2 - w)$

k $4(3y + 4) - 2(5y - 1) - 18$

l $3p + 2(4p - 6) - (9p + 12)$

m $5(3 - 2m) + 3(2m - 6) - 4(1 - 8m) + 2m + 7.$

2. Calculate the shaded area of the rectangle shown, in terms of y .

**Exercise 4****Solving Basic Equations**

1. Solve each of the following :-

a $y + 5 = 7$

b $t - 3 = 6$

c $5 + h = 11$

d $w + 31 = 30$

e $15 + k = 13$

f $121 - s = 123$

g $3x = 12$

h $5g = -15$

i $3u = 1$

j $\frac{1}{2}d = 40$

k $\frac{1}{3}r = 4$

l $\frac{4}{5}w = 16.$

2. Solve (show all your working) :-

a $2x + 1 = 13$

b $3w - 1 = 20$

c $5y - 11 = 19$

d $5x + 1 = 21$

e $17q - 17 = 17$

f $12d + 12 = 0$

g $6k - 4 = 17$

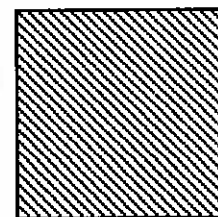
h $11t + 10 = 76$

i $\frac{1}{4}g - 1 = 11.$

3. The perimeter of a square is found to be $3x - 7$ cm.

When measured the perimeter is 17 cm.

Find the value of x .



Perimeter = $3x - 7$

Exercise 5**Solving Equations with Brackets**

1. Solve each of the following :-

a $3(y + 5) = 18$

b $5(t - 3) = 35$

c $2(5 + h) = 14$

d $3(w + 1) = 33$

e $4(5 + k) = 36$

f $6(11 - s) = 60$

g $3(x + 1) = 12$

h $5(g + 2) = -15$

i $3(u - 11) = -18$

j $(2d + 4) + d + 1 = 11$

k $4(r - 2) + 2(r + 1) = 12$

l $3(2w + 2) - (w + 6) = 10$

m $2(2f + 3) + 3(4f - 1) - 2(5f + 3) = 0.$

2. Mixture :-

Solve (show all your working) :-

a $x + 6 = 11$

b $3w - 2 = 13$

c $\frac{1}{2}v - 1 = 13$

d $\frac{3}{4}f + 3 = 24$

e $4(2x - 1) = 4$

f $2(3e + 7) - 3 = 5.$

Exercise 6**Evaluating Expressions and Formulae**

1. Given $a = 2$, find :-

a $a + 6$

b $2a$

c $5a - 3$

d $(7a + 4) \div 2$

e $4(a + 2)$

f $6(11 - a) - 53$

g $3(a + 1) - 12$

h $5(a + 2) + 15$

i $3(a - 11) + 27.$

2. Given $b = 3$, $c = 5$ and $d = -1$, evaluate :-

a $b + c + d$

b $2b - c - 3d$

c $\frac{1}{2}(bc + d)$

d $3bcd$

e $cdb - dbc$

f $0.5(bd - cd).$

3. a If $f = 2$, $g = 4$ and $h = -2$, find e , given $f + g + h + e = 10$.

b If $p = 3$, $r = -3$ and $s = 2$, find t given $st - prs = 12$.

4. If $m = 4$ and $n = 6$, find the values of :-

a m^2

b n^2

c \sqrt{m}

d $m^2 + n^2$

e $2m^2$

f $3mn^2$

g $\sqrt{mn + 1}$

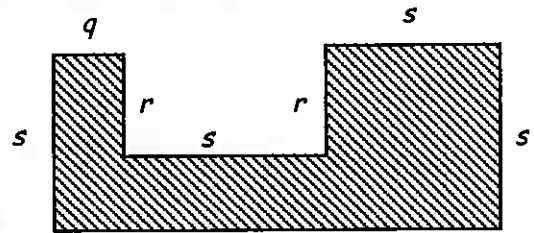
h $\sqrt{5m - 2n + 1}$

i $\sqrt{m^2 + n^2 - 3}.$

Exercise 7 Constructing & Evaluating Formulae

- A truck weighs y tonnes. The truck can carry x tonnes when fully loaded.
 - Write a formula for T , the weight of the truck and a maximum load.
 - Find T when $y = 4$ and $x = 1.5$.
 - Find y when $T = 6.25$ and $x = 2.1$.

- Write down a formula for the perimeter, P , in terms of q , r and s .
 - Find P given $q = 2$, $r = 4$ and $s = 7$.
 - Find q given $P = 132$, $r = 12$ and $s = 15$.



- (Difficult). Find the area of the shape in Qu 2, given that $s = 3$, $r = 2$ and $q = 1$.

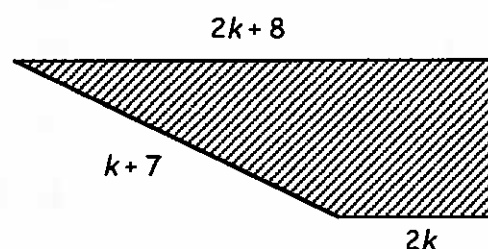
Revisit - Review - Revise Exercise 7

- Simplify fully :-

a $t + t + t$	b $p \times p \times p$	c $3k + 5p + 4k$	d $4d + 9d - 7d$
e $2w \times 6w$	f $7u + 1 - 6u - 1$	g $7a + 2b + 4 - b + 7$	
h $5 \times 2y$	i $6k^2 \times k$	j $12p \div 2$	k $12w^2 \div 4w$
- Given $a = 3$, $b = 4$ and $c = -1$, evaluate :-

a $3a - 2b$	b $2abc - 5c$	c $\sqrt{2a + b + c}$	d $8a^2 \div 4bc$
-------------	---------------	-----------------------	-------------------
- Multiply out the brackets and simplify :-

a $3(2b - 2) + 4$	b $-3(5c - 6) - 9$	c $5 + 2(g + 2)$	d $8 - 5(2w - 3) + 7$
e $4(2r + 3) + 3(4r - 8)$	f $7(h - 2) - 2(3h - 6) - (h + 1) + 3$		
- A shape is made from a right angled triangle and a square as shown. Find (in terms of k) the :-
 - perimeter
 - area of this shape.



5. Find the value of each of the following capital letters :-

a $P = 2t + 7w$, given $t = 12$ and $w = -2$

b $G = \frac{2wr}{k}$, given $w = 10$, $r = -3$ and $k = -4$

c $C = \sqrt{a^2 + b^2}$, given $a = 3$ and $b = 4$.

6. The cost of hiring gym equipment is given by the formula $C = D + 7d$, where C is cost in £'s, D is the deposit in £'s and d is the number of days.

How much would it cost to hire the equipment for 8 days with a deposit of £10?



7. a Write down the formula for the volume of a cuboid.
 b Find the volume of a cuboid with length 10 cm, breadth 6 cm and height 5 cm.

Cumulative Ex 2



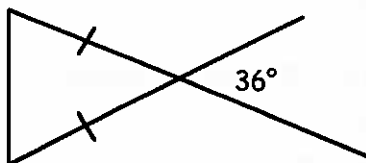
1. Find :-
- | | | | | | |
|---|-------------------------|---|------------------|---|----------------------|
| a | 125×6 | b | $8760 \div 4$ | c | 40% of 750 kg |
| d | $\frac{4}{5}$ of 9500 m | e | 0.86×70 | f | $4.3 + 6.4 \times 3$ |
| g | $(-5) + (-3)$ | h | $6 - (-6)$ | i | $-4 - (-5)$. |

2. Express each percentage as a fraction in its simplest form where possible :-

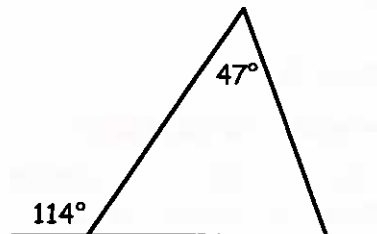
- a 75% b 34% c 84% d 12.5%.

3. Copy each of the diagrams below and fill in the missing angles :-

a



b



4. a Plot these on a Cartesian coordinate diagram :- $A(4, 3)$, $B(-3, 1)$ and $C(4, -2)$.
 b Given that A , B , C and D form the vertices (corners) of a parallelogram, give three possible answers for D .

3. a 1290 b 34000 c 117
d 750 e 25 f 37
4. a 70° b 100°
5. 94°
6. a -3 b -6 c -3
d -15 e 24 f -27
g -10 h -9 i 12

Answers to Chapter 5

Exercise 1 - Coordinates in 4 Quadrants

1. a A(-3,4), B(2,4), C(4,-3), D(-3,-3),
E(3,-1), F(0,-4), G(-2,0)
b F c A & D d A&B, D&C
e D f P(-2,-3)
2. a/b See diagram c U(-2,3)
3. a R(-1,4), S(4,3), T(2,1)
b see diagram - R'(-1,-4), S'(4,-3), T'(2,-1)
c see diagram - R''(1,-4), S''(-4,-3), T''(-2,-1)
4. A(-1,-5), B(-7,0), C(-2,-2)

Review - Revisit - Revise Exercise 5

1. a I(4,3), J(2,1), K(2,-1), L(5,-2),
M(3,-3), N(-3,-3), P(-3,2), Q(0,4)
b Q(0,4) c N(-3,-3)
2. a S(2,-4)
3. a/b/c See diagram
d R'(3,3), S'(8,2), T'(7,-2), U'(2,-4)

Non- Calculator Exercise 2

1. a 7900 b 862500
2. a Seven thousand eight hundred and fifty two
b eight hundred and sixty two thousand, four hundred and fifty eight
3. a 1029 b 61024 c 3300
d 829 e 13017 f 29.19
4. a 32 kg b £4600 c 13000 km
d 40 m e £2.40 f 60 kW
5. a $\frac{2}{4}, \frac{3}{6}$ b $\frac{6}{8}, \frac{9}{12}$
6. a 46 cm b 120 cm^2

Answers to Chapter 6

Exercise 1 - Percentages - No Calculator

1. a £2.40 b £126 c \$11 c 230 kg
d £8 e 37.5 m g 26 km h \$30
i 21p j 1540 k 4 cm l €245
2. a £192 b 178.5 km
3. a £240 b £120 c £60
4. a 175 b 25

Exercise 2 - Percentages with a Calculator

1. a 31.28 kmb 59.28 kg c 60.8 m
d £269.50 e \$7.56 f €5
g £30.60 h 832.5 km i 37p
2. a (i) 68% (ii) 2176 b 20160 c 504
3. 69.76 kg 4. £3220

Exercise 3 - Linking Fractions, Decimals % %ages

1. a 66.7% b 14.3% c 78.9% d 177.5%
2. a Maths - 85%, English - 81.25%,
French - 73.3%, Music - 70%
b Maths (obviously)
3. a $47\% - \frac{24}{50} - 0.49 - 0.5$
b $\frac{2}{3}$ of £48 - $0.04 \times £804$ - 45% of £72

Review - Revisit - Revise Exercise 6a

1. a $\frac{1}{2}$ b $\frac{1}{4}$ c $\frac{3}{4}$ d $\frac{1}{3}$
e $\frac{3}{5}$ f $\frac{7}{10}$ g $\frac{1}{20}$ h $\frac{77}{100}$
2. a 43% b 9% c 30% d 22.5%
e 66.66...% f 80% g 125% h 150%
3. a £1804 b £544

Review - Revisit - Revise Exercise 6b

1. a £621 b 10.26 kg c 79.04 m
d £302.50 e \$13.50 f €420
g £255 h 55 kg i 43
j \$540 k 7084 m l 480 km
2. a £21528 b £16652
3. £32
4. £852.60

Answers to Chapter 7

Exercise 1 - Simplifying

1. a $3y$ b $2t$ c $9p$ d $9k$
e $8w+3$ f $u+3$ g $11y+2b+7$
h $12y$ i $42k$ j $8p$ k $3w$
l $3ab$ m $6v^2$ n $6a^2b$ o $24c^2d^2$
p 6 q $2k$ r 5 s $3t$
2. a $6x^2 + 3x$ b $7y^2 + 21y$

Exercise 2 - Breaking Brackets

1. a $3x+12$ b $7y-21$
c $10k+25$ d $66y-77$
e y^2+2y f k^2-3k
g $3u^2+12u$ h $9r^2-12r$
i $-3q-15$ j $-8t-24$
k $-5j+10$ l $-6f+16$
m $-y^2-7y$ n $-h^2+3h$
o $-4w^2-2w$ p $-15k+20k^2$

2. a $A = 2x(3x + 4)$ b $A = 6x^2 + 8x$

Exercise 3 - Breaking Brackets & Simplifying

1. a $5k + 13$ b $16y + 20$ c $21e - 3$
 d $2t + 14$ e $2 - 3w$ f $-g$
 g $5w - 1$ h $28y + 3$ i $8r$
 j 0 k $2y$
 l $2p - 24$ m $30m$
2. $A = 2y(5y - 8) - y(6y - 1) = 10y^2 - 16y - 6y^2 + y$
 $A = 4y^2 - 15y$

Exercise 4 - Solving Basic Equations

1. a 2 b 9 c 6
 d -1 e -2 f -2
 g 4 h -3 i $1/3$
 j 80 k 12 l 20
2. a 6 b 7 c 6
 d 4 e 2 f -1
 g $3\frac{1}{2}$ h 6 h 48
3. $x = 8$

Exercise 5 - Solving Equations with Brackets

1. a 1 b 10 c 2
 d 10 e 4 f 1
 g 3 h -5 i 5
 j 2 k 3 l 2 m $1/2$
2. a 5 b 5 c 28
 d 28 e 1 f -1

Exercise 6 - Evaluating Expressions and Formulae

1. a 8 b 4 c 7
 d 9 e 16 f 1
 g -3 h 35 i 0
2. a 7 b 4 c 7
 d -45 e 0 f 1
3. a 6 b -3
4. a 16 b 36 c 2
 d 52 e 32 f 432
 g 5 h 3 i 7

Exercise 7 - Constructing & Evaluating Formulae

1. a $T = x + y$ b 5.5 c 4.15
 2. a $P = 6s + 2q + 2r$ b 54 c 9
 3. 15

Review - Revisit - Revise Exercise 7

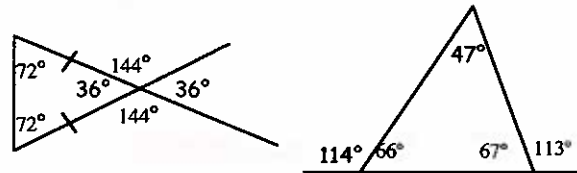
1. a $3t$ b p^3 c $7k + 5p$ d $6d$
 e $12w^2$ f u g $7a + b + 11$
 h $10y$ i $6k^3$ j $6p$ k $3w$

2. a 1 b -19 c 3 d $-4\frac{1}{2}$

3. a $6b - 2$ b $-15c + 9$ c $2g + 9$
 d $30 - 10we$ $20r - 12$ f 0
4. a $7k + 15$ b $4k^2 + 8k$
5. a 10 b 15 c 5
6. £66
7. a $V = L \times B \times H$ b 300 cm^3

Cumulative Exercise 2

1. a 750 b 2190 c 300 kg
 d 7600 m e 60.2 f 23.5
 g -8 h 12 i 1
2. a $3/4$ b $17/50$ c $21/25$ d $1/8$
3. a



4. a See diagram b $(11, 0), (-3, 6), (-3, -4)$

Answers to Chapter 8

Exercise 1 - Perimeter & Area

1. a (i) 34 cm (ii) 60 cm²
 b (i) 20 cm (ii) 25 cm²
 c (i) 30 cm (ii) 30 cm²
 d (i) 140 m (ii) 1000 m²
 e (i) 440 cm (ii) 4000 cm²
2. a 80 m b 1440 m c £259.20

Exercise 2 - Area of a Rhombus & Kite

1. a 30 cm² b 39 cm² c 75 cm² d 54 cm²

Exercise 3 - Area of a Parallelogram

1. a 180 cm² b 26 cm² c 77 cm² d 270 cm²

Exercise 4 - Area of a Trapezium

1. a 180 cm² b 76 cm² c 34 cm² d 162 cm²

Exercise 5 - Composite Area

1. a 26 cm² b 140 cm² c 55.5 cm² d 375 cm²

Review - Revisit - Revise Exercise 8

1. a (i) parallelogram
 (ii) $A = B \times H$ (iii) 150 cm²
 b (i) trapezium
 (ii) $A = \frac{1}{2}h(a + b)$ (iii) 240 cm²

Algebraic Operations 1 ~ Brackets

Q1. Multiply out the brackets :

a. $3(x-5)$	b. $5(y+7)$	c. $8(a+6)$	d. $6(3+t)$
e. $x(x+9)$	f. $y(3-y)$	g. $b(b-4)$	h. $p(5+p)$
i. $a(b+c)$	j. $x(x-y)$	k. $p(q-r)$	l. $a(a+x)$

Q2. Expand the brackets :

a. $4(2a+5)$	b. $7(3y-4)$	c. $2(12x+11)$	d. $9(4c-7)$
e. $2a(a+3)$	f. $5x(x-8)$	g. $10y(3-y)$	h. $3t(t+6)$
i. $3x(2x-9)$	j. $2y(7-5y)$	k. $4b(3b-8)$	l. $5x(5x+$

4)

Q3. Expand and simplify :

a. $3(3a-1)+2a$	b. $2(5x+3)-3x$. $8(b+2)-9$
d. $4(2h-1)+7$	e. $5(3-4x)+11x$	f. $3(2c+1)-8$
g. $2(4t+3)-10t$	h. $p(p+q)-3pq$	i. $7(1-3c)-10$
j. $3+2(2x+5)$	k. $7a+3(2a-3)$	l. $5-2(2x-7)$
m. $6+5(3y-2)$	n. $9b-2(4b-1)$	o. $8-3(5x+7)$
p. $12x-4(4x-5)$	q. $3c+5(1-2c)$	r. $7-2(5a-12)$

Q4. Multiply out the brackets :

a. $(x+2)(x+3)$	b. $(y+5)(y+2)$	c. $(a+4)(a+6)$
d. $(b+3)(b+4)$	e. $(x+9)(x+5)$	f. $(s+3)(s+8)$
g. $(y+7)(y+4)$	h. $(b+3)(b+3)$	i. $(c+6)(c+7)$
j. $(a+8)(a+4)$	k. $(y+4)(y+2)$	l. $(x+9)(x+8)$
m. $(p+12)(p+7)$	n. $(c+5)(c+6)$	o. $(t+7)(t+9)$
p. $(x+4)(x+9)$	q. $(y+12)(y+5)$	r. $(a+11)(a+9)$

Q5. Multiply out the brackets :

a. $(x-1)(x-5)$	b. $(c-4)(c-2)$	c. $(y-3)(y-7)$
d. $(b-6)(b-8)$	e. $(x-5)(x-2)$	f. $(s-8)(s-5)$
g. $(y-2)(y-9)$	h. $(a-4)(a-4)$	i. $(t-3)(t-6)$
j. $(x-6)(x-5)$	k. $(b-5)(b-3)$	l. $(c-10)(c-4)$
m. $(a-3)(a-9)$	n. $(y-8)(y-7)$	o. $(x-12)(x-3)$
p. $(s-4)(s-7)$	q. $(d-1)(d-15)$	r. $(b-10)(b-1)$

Q6. Multiply out the brackets :

a. $(x-1)(x+5)$	b. $(a+3)(a-7)$	c. $(t-5)(t+4)$
d. $(y+8)(y-4)$	e. $(c+2)(c-7)$	f. $(x-6)(x+1)$
g. $(b-2)(b+9)$	h. $(p-10)(p+2)$	i. $(y-8)(y+7)$

j.	$3 + 2(2x + 5)$	k.	$7a + 3(2a - 3)$	l.	$5 + 2(2x - 7)$
m.	$6 + 5(3y - 2)$	n.	$9b + 2(4b - 1)$	o.	$8 + 3(5x + 7)$
p.	$12x + 4(4x - 5)$	q.	$3c + 5(1 - 2c)$	r.	$7 + 2(5a - 12)$

Algebraic Operations 4 ~ Equations

Q1. Solve :

a.	$x + 3 = 5$	b.	$x + 5 = 9$	c.	$x + 9 = 12$	d.	$x + 2 = 7$
e.	$a + 2 = 4$	f.	$y + 3 = 8$	g.	$p + 7 = 11$	h.	$c + 4 = 5$
i.	$b + 7 = 9$	j.	$q + 8 = 8$	k.	$d + 5 = 10$	l.	$x + 1 = 6$
m.	$c + 4 = 6$	n.	$p + 6 = 13$	o.	$a + 2 = 15$	p.	$y + 5 = 14$

Q2. Solve:

a.	$2x = 6$	b.	$5x = 20$	c.	$8x = 16$	d.	$3x = 27$
e.	$4a = 16$	f.	$7y = 28$	g.	$6p = 18$	h.	$5c = 25$
i.	$9b = 36$	j.	$2q = 18$	k.	$7d = 70$	l.	$4x = 32$
m.	$8c = 56$	n.	$3p = 15$	o.	$5a = 35$	p.	$6y = 42$

Q3. Solve :

a.	$x - 3 = 4$	b.	$x - 5 = 1$	c.	$x - 9 = 2$	d.	$x - 2 = 7$
e.	$a - 2 = 4$	f.	$y - 3 = 8$	g.	$p - 7 = 11$	h.	$c - 4 = 5$
i.	$b - 7 = 9$	j.	$q - 8 = 8$	k.	$d - 5 = 10$	l.	$x - 1 = 6$
m.	$c - 4 = 6$	n.	$p - 6 = 14$	o.	$a - 2 = 15$	p.	$y - 5 = 14$

Q4. Solve:

a.	$2a = 36$	b.	$5m = 55$	c.	$8q = 64$	d.	$3y = 48$
e.	$4x = 52$	f.	$7c = 63$	g.	$6d = 72$	h.	$5a = 125$
i.	$9p = 81$	j.	$2q = 17$	k.	$4x = 22$	l.	$6q = 33$
m.	$8c = 28$	n.	$5x = 90$	o.	$10a = 42$	p.	$4y = 42$

Q5. Solve :

a.	$2x + 3 = 5$	b.	$4x + 5 = 9$	c.	$3x + 3 = 12$	d.	$5x + 2 = 7$
e.	$2a + 2 = 14$	f.	$5y + 3 = 18$	g.	$2p + 7 = 21$	h.	$3c + 4 =$

26
50

i. $6b + 7 = 49$ j. $8q + 8 = 8$ k. $2d + 5 = 35$ l. $3x + 5 =$
 m. $8c + 4 = 36$ n. $7p + 6 = 55$ o. $12a + 2 = 26$ p. $9y + 5 =$

Q6. Solve :

29
80
40

a. $3x - 2 = 7$ b. $4x - 5 = 11$ c. $2x - 9 = 3$ d. $3x - 7 = 5$
 e. $7a - 2 = 12$ f. $5y - 3 = 22$ g. $6p - 7 = 29$ h. $4c - 3 =$
 i. $8b - 7 = 57$ j. $10q - 8 = 72$ k. $3d - 5 = 31$ l. $9x - 1 =$
 m. $4c - 9 = 15$ n. $6p - 2 = 40$ o. $5a - 2 = 73$ p. $3y - 14 =$

Q7. Solve :

a. $\frac{1}{2}x = 6$ b. $\frac{1}{4}x = 5$ c. $\frac{1}{3}x = 7$ d. $\frac{1}{8}x = 3$
 e. $\frac{1}{5}x = 2$ f. $\frac{1}{3}x = 3$ g. $\frac{1}{7}x = 4$ h. $\frac{1}{2}x = 8$
 i. $\frac{1}{4}x = 1$ j. $\frac{1}{6}x = 8$ k. $\frac{1}{5}x = 10$ l. $\frac{1}{3}x = 9$

Q8. Multiply out the brackets and solve :

a. $2(x + 5) = 12$ b. $5(y + 7) = 45$ c. $3(a + 6) = 36$
 d. $6(x + 4) = 54$ e. $4(x + 9) = 48$ f. $3(c + 8) = 30$
 g. $7(d + 3) = 56$ h. $5(m + 5) = 55$ i. $2(y + 14) = 50$
 j. $8(d - 6) = 24$ k. $3(s - 8) = 9$ l. $4(x - 15) = 20$
 m. $10(w - 2) = 50$ n. $5(c - 5) = 35$ o. $3(a - 10) = 33$

Q9. Solve :

a. $6y + 3 = y + 18$ b. $5a + 7 = a + 15$
 c. $9c + 5 = c + 21$ d. $10x + 1 = 4x + 19$
 e. $5b + 3 = 2b + 9$ f. $7n + 6 = 3n + 18$
 g. $3x + 2 = x + 14$ h. $9c + 58 = 6c + 73$
 i. $16 + 7y = 2y + 31$ j. $15a + 4 = 3a + 76$
 k. $16 + 25x = 5x + 96$ l. $6n + 3.5 = 3n + 5$
 m. $19b + 8 = 10b + 80$ n. $14x + 4 = 3x + 125$
 o. $250 + 3x = 295$ p. $20y + 4 = 3y + 55$
 q. $13a + 6 = a + 150$ r. $50x + 40 = 10x + 200$
 s. $19y + 3 = 8y + 80$ t. $5b + 2 = 2b + 50$

u. $2 + 14x = 2x + 110$
 w. $19x + 10 = 4x + 70$

v. $20x + 11 = 13x + 60$
 x. $205a + 13 = 10a + 403$

Q10. Solve :

a. $6y - 3 = 3y + 15$
 c. $9c - 8 = 4c + 12$
 e. $5b - 3 = 2b + 9$
 g. $7x - 14 = 3x + 2$
 i. $7y - 16 = 2y + 34$
 k. $25x - 16 = 5x + 84$
 m. $b + 13 = 9b - 7$
 o. $x + 25 = 3x - 5$
 q. $a + 6 = 13a - 18$
 s. $8y + 3 = 19y - 74$

b. $5a - 9 = a + 15$
 d. $10x - 1 = 4x + 5$
 f. $3n - 10 = n + 2$
 h. $6c - 13 = 3c + 59$
 j. $15a - 8 = 3a + 76$
 l. $6n - 3.5 = 3n + 4$
 n. $3x + 12 = 4x - 4$
 p. $5y + 4 = 20y - 26$
 r. $10x + 40 = 50x - 120$
 t. $2b + 2 = 5b - 16$

u. $2 + 2x = 10x - 14$
 w. $4x + 10 = 9x - 50$

v. $13x + 11 = 20x - 38$
 x. $10a + 13 = 20a - 387$

Algebraic Operations 5 ~ Inequalities

Q1. Solve :

a. $x + 4 > 5$ b. $x + 6 > 9$ c. $x + 8 > 12$ d. $x + 3 > 7$
 e. $a + 1 > 4$ f. $y + 5 > 8$ g. $p + 2 > 11$ h. $c + 4 > 5$
 i. $b + 3 > 9$ j. $q + 8 > 8$ k. $d + 7 > 10$ l. $x + 2 > 6$
 m. $c + 1 > 6$ n. $p + 4 > 13$ o. $a + 3 > 15$ p. $y + 2 > 14$

Q2. Solve :

a. $x + 5 < 7$ b. $x + 1 < 8$ c. $x + 3 < 13$ d. $x + 5 < 9$
 e. $a + 3 < 6$ f. $y + 5 < 11$ g. $p + 2 < 10$ h. $c + 1 < 5$
 i. $b + 8 < 13$ j. $q + 3 < 20$ k. $d + 7 < 7$ l. $x + 10 < 15$
 m. $c + 3 < 9$ n. $p + 2 < 16$ o. $a + 4 < 15$ p. $y + 9 < 10$

Q3. Solve:

a. $2x > 6$ b. $5x > 20$ c. $8x > 16$ d. $3x > 27$
 e. $4a > 16$ f. $7y > 28$ g. $6p > 18$ h. $5c > 25$
 i. $9b < 36$ j. $2q < 18$ k. $7d < 70$ l. $4x < 32$

m. $8c < 56$ n. $3p < 15$ o. $5a < 35$ p. $6y < 42$

Q4. Solve :

a. $x - 3 < 4$ b. $x - 5 > 1$ c. $x - 9 > 2$ d. $x - 2 < 7$
e. $a - 2 < 4$ f. $y - 3 > 8$ g. $p - 7 < 11$ h. $c - 4 > 5$
i. $b - 7 > 9$ j. $q - 8 < 8$ k. $d - 5 > 10$ l. $x - 1 > 6$
m. $c - 4 > 6$ n. $p - 6 < 14$ o. $a - 2 < 15$ p. $y - 5 < 14$

Q5. Solve :

a. $2x + 1 < 5$ b. $4x + 1 > 9$ c. $3x + 3 > 12$ d. $5x + 2 >$
12
e. $2a + 2 < 8$ f. $5y + 3 < 13$ g. $2p + 5 > 21$ h. $3c + 1 <$
16
i. $6b + 13 > 49$ j. $8q + 8 < 8$ k. $3d + 5 < 35$ l. $4x + 5 >$
21
m. $8c + 12 < 36$ n. $7p + 6 < 55$ o. $12a + 2 > 26$ p. $9y + 23 <$
50

Q6. Solve :

a. $3x - 1 > 8$ b. $4x - 3 > 13$ c. $2x - 7 < 5$ d. $3x - 5 > 4$
e. $7a - 1 < 13$ f. $5y - 2 < 23$ g. $6p - 5 > 31$ h. $4c - 7 > 25$
i. $8b - 3 > 61$ j. $10q - 7 < 73$ k. $3d - 2 < 34$ l. $9x - 8 > 73$
m. $4c - 5 < 19$ n. $6p - 1 < 41$ o. $5a - 4 < 71$ p. $3y - 24 < 30$

Algebraic Operations 1 ~ Brackets

Q1. Multiply out the brackets :

a. $3(x - 5)$	b. $5(y + 7)$	c. $8(a + 6)$	d. $6(3 + t)$
e. $x(x + 9)$	f. $y(3 - y)$	g. $b(b - 4)$	h. $p(5 + p)$
i. $a(b + c)$	j. $x(x - y)$	k. $p(q - r)$	l. $a(a + x)$

Q2. Expand the brackets :

a. $4(2a + 5)$	b. $7(3y - 4)$	c. $2(12x + 11)$	d. $9(4c - 7)$
e. $2a(a + 3)$	f. $5x(x - 8)$	g. $10y(3 - y)$	h. $3t(t + 6)$
i. $3x(2x - 9)$	j. $2y(7 - 5y)$	k. $4b(3b - 8)$	l. $5x(5x +$

4)

Q3. Expand and simplify :

a. $3(3a - 1) + 2a$	b. $2(5x + 3) - 3x$	c. $8(b + 2) - 9$
d. $4(2h - 1) + 7$	e. $5(3 - 4x) + 11x$	f. $3(2c + 1) - 8$
g. $2(4t + 3) - 10t$	h. $p(p + q) - 3pq$	i. $7(1 - 3c) - 10$
j. $3 + 2(2x + 5)$	k. $7a + 3(2a - 3)$	l. $5 - 2(2x - 7)$
m. $6 + 5(3y - 2)$	n. $9b - 2(4b - 1)$	o. $8 - 3(5x + 7)$
p. $12x - 4(4x - 5)$	q. $3c + 5(1 - 2c)$	r. $7 - 2(5a - 12)$

Q4. Multiply out the brackets :

a. $(x + 2)(x + 3)$	b. $(y + 5)(y + 2)$	c. $(a + 4)(a + 6)$
d. $(b + 3)(b + 4)$	e. $(x + 9)(x + 5)$	f. $(s + 3)(s + 8)$
g. $(y + 7)(y + 4)$	h. $(b + 3)(b + 3)$	i. $(c + 6)(c + 7)$
j. $(a + 8)(a + 4)$	k. $(y + 4)(y + 2)$	l. $(x + 9)(x + 8)$
m. $(p + 12)(p + 7)$	n. $(c + 5)(c + 6)$	o. $(t + 7)(t + 9)$
p. $(x + 4)(x + 9)$	q. $(y + 12)(y + 5)$	r. $(a + 11)(a + 9)$

Q5. Multiply out the brackets :

a. $(x - 1)(x - 5)$	b. $(c - 4)(c - 2)$	c. $(y - 3)(y - 7)$
d. $(b - 6)(b - 8)$	e. $(x - 5)(x - 2)$	f. $(s - 8)(s - 5)$
g. $(y - 2)(y - 9)$	h. $(a - 4)(a - 4)$	i. $(t - 3)(t - 6)$
j. $(x - 6)(x - 5)$	k. $(b - 5)(b - 3)$	l. $(c - 10)(c - 4)$
m. $(a - 3)(a - 9)$	n. $(y - 8)(y - 7)$	o. $(x - 12)(x - 3)$
p. $(s - 4)(s - 7)$	q. $(d - 1)(d - 15)$	r. $(b - 10)(b - 1)$

Q6. Multiply out the brackets :

a. $(x - 1)(x + 5)$	b. $(a + 3)(a - 7)$	c. $(t - 5)(t + 4)$
d. $(y + 8)(y - 4)$	e. $(c + 2)(c - 7)$	f. $(x - 6)(x + 1)$
g. $(b - 2)(b + 9)$	h. $(p - 10)(p + 2)$	i. $(y - 8)(y + 7)$

j. $(z + 4)(z - 6)$
m. $(c - 3)(c + 3)$

k. $(x + 1)(x - 1)$
n. $(p - 7)(p + 1)$

l. $(a + 2)(a - 15)$
o. $(b + 10)(b - 5)$

Q7. Multiply out the brackets

a.	$(x + 3)^2$	b.	$(w - 2)^2$	c.	$(a - 5)^2$	d.	$(c + 8)^2$
e.	$(y - 4)^2$	f.	$(a + 6)^2$	g.	$(b + 1)^2$	h.	$(s + 7)^2$
i.	$(b - 9)^2$	j.	$(x - 10)^2$	k.	$(c - 1)^2$	l.	$(y - 3)^2$
m.	$(2x - 1)^2$	n.	$(5y + 2)^2$	o.	$(3x + 4)^2$	p.	$(4b - 5)^2$

Q8. Multiply out the brackets

a.	$(a + b)(c + d)$	b.	$(2 + x)(3 + y)$	c.	$(a + 4)(b + 5)$
d.	$(p - q)(r - s)$	e.	$(1 - a)(7 - b)$	f.	$(c - 6)(d + 8)$

Q9. Multiply out the brackets

a.	$x(x^2 + x - 1)$	b.	$3(2x^2 - 3x + 5)$	c.	$x(3x^2 - 5x + 8)$
d.	$2x(x^2 + 2x + 3)$	e.	$-5(x^2 - 8x + 2)$	f.	$x(x^2 - 4x - 7)$

Q10. Multiply out the brackets and simplify

a.	$(x + 2)(x^2 + 3x + 1)$	b.	$(x + 5)(x^2 + 4x + 2)$
c.	$(x + 1)(x^2 + 5x + 4)$	d.	$(x + 3)(x^2 + x + 5)$
e.	$(x + 8)(x^2 + 2x + 3)$	f.	$(x + 4)(x^2 + 7x + 6)$
g.	$(x + 12)(x^2 + x + 7)$	h.	$(x + 10)(x^2 + 3x + 9)$
i.	$(x + 9)(x^2 + 12x + 7)$	j.	$(x + 7)(x^2 + 9x + 1)$
k.	$(x + 3)(x^2 - 5x + 2)$	l.	$(x - 6)(x^2 - x + 11)$
m.	$(x + 2)(x^2 - 8x + 3)$	n.	$(x + 5)(x^2 - 6x + 7)$
o.	$(x + 10)(x^2 + 3x - 6)$	p.	$(x + 9)(x^2 + 5x - 6)$
q.	$(x + 11)(x^2 + x - 2)$	r.	$(x + 7)(x^2 + 8x - 3)$

Q11. Multiply out the brackets and simplify

a.	$(x - 1)(x^2 + x + 1)$	b.	$(x - 7)(x^2 + 3x + 5)$
c.	$(x - 2)(x^2 + 4x + 3)$	d.	$(x - 4)(x^2 + 6x + 1)$
e.	$(x - 3)(x^2 - 2x + 5)$	f.	$(x - 6)(x^2 - 5x + 2)$
g.	$(x - 4)(x^2 - x + 2)$	h.	$(x - 1)(x^2 - 2x + 7)$
i.	$(x - 9)(x^2 + 3x - 2)$	j.	$(x - 5)(x^2 + 8x + 6)$
k.	$(x - 8)(x^2 + x - 7)$	l.	$(x - 3)(x^2 + 9x - 12)$
m.	$(x - 5)(x^2 - 4x - 1)$	n.	$(x - 10)(x^2 - 3x - 8)$
o.	$(x - 6)(x^2 - 7x - 2)$	p.	$(x - 1)(x^2 - 17x - 13)$

Q12. Multiply out the brackets and simplify

a.	$(x + 5)(2x^2 + 4x + 9)$	b.	$(x - 3)(5x^2 + x + 6)$
c.	$(x - 2)(6x^2 - 5x + 7)$	d.	$(x + 7)(3x^2 + 9x - 2)$
e.	$(x - 4)(5x^2 - x - 8)$	f.	$(x + 1)(7x^2 - 2x + 11)$

g. $(2x + 1)(3x^2 + 4x + 1)$
 i. $(5x - 2)(2x^2 + 3x - 7)$

h. $(3x + 4)(x^2 - 11x + 2)$
 j. $(4x - 3)(3x^2 - 5x - 4)$

Algebraic Operations 1 ~ Brackets

- Q1. a. $3x - 15$ b. $5y + 35$ c. $8a + 48$ d. $18 + 6t$
 e. $x^2 + 9x$ f. $3y - y^2$ g. $b^2 - 4b$ h. $5p + p^2$
 i. $ab + ac$ j. $x^2 - xy$ k. $pq - pr$ l. $a^2 + ax$
- Q2. a. $8a + 20$ b. $21y - 28$ c. $24x + 22$ d. $36c - 63$
 e. $2a^2 + 6a$ f. $5x^2 - 40x$ g. $30y - 10y^2$ h. $3t^2 + 18t$
 i. $6x^2 - 27x$ j. $14y - 10y^2$ k. $12b^2 - 32b$ l. $25x^2 + 20x$
- Q3. a. $11a - 3$ b. $7x + 6$ c. $8b - 7$ d. $8h + 3$
 e. $15 - 9x$ f. $6c - 5$ g. $-2t + 6$ h. $p^2 - 2p$
 i. $-3 - 21c$ j. $13 + 4x$ k. $13a - 9$ l. $19 - 4x$
 m. $-4 + 15y$ n. $b + 2$ o. $-13 - 15x$ p. $-4x + 20$
 q. $-7c + 5$ r. $31 - 10a$
- Q4. a. $x^2 + 5x + 6$ b. $y^2 + 7y + 10$ c. $a^2 + 10a + 24$ d. $b^2 + 7b +$
 12 e. $x^2 + 14x + 45$ f. $s^2 + 11s + 24$ g. $y^2 + 11y + 28$ h. $b^2 + 6b + 9$
 72 i. $c^2 + 13c + 42$ j. $a^2 + 12a + 32$ k. $y^2 + 6y + 8$ l. $x^2 + 17x +$
 +36 m. $p^2 + 19p + 84$ n. $c^2 + 11c + 30$ o. $t^2 + 16t + 63$ p. $x^2 + 13x$
 q. $y^2 + 17y + 60$ r. $a^2 + 20a + 99$
- Q5. a. $x^2 - 6x + 5$ b. $c^2 - 6c + 8$ c. $y^2 - 10y + 21$ d. $b^2 - 14b +$
 48 e. $x^2 - 7x + 10$ f. $s^2 - 13s + 40$ g. $y^2 - 11y + 18$ h. $a^2 - 8a +$
 16 i. $t^2 - 9t + 18$ j. $x^2 - 11x + 30$ k. $b^2 - 8b + 15$ l. $c^2 - 14c +$
 40 m. $a^2 - 12a + 27$ n. $y^2 - 15y + 56$ o. $x^2 - 15x + 36$ p. $s^2 - 11s$
 +28 q. $d^2 - 16d + 15$ r. $b^2 - 11b + 10$
- Q6. a. $x^2 + 4x - 5$ b. $a^2 - 4a - 21$ c. $t^2 - t - 20$ d. $y^2 + 4y -$
 32 e. $c^2 - 5c - 14$ f. $x^2 - 5x - 6$ g. $b^2 + 7b - 18$ h. $p^2 - 8p -$
 20 i. $y^2 - y - 56$ j. $z^2 - 2z - 24$ k. $x^2 - 1$ l. $a^2 - 13a -$
 30 m. $c^2 - 9$ n. $p^2 - 6p - 7$ o. $b^2 + 5b - 50$ p. $s^2 + 5s - 36$
 q. $y^2 - 6y - 27$ r. $x^2 - 10x - 11$
- Q7. a. $x^2 + 6x + 9$ b. $w^2 - 4w + 4$ c. $a^2 - 10a + 25$ d. $c^2 + 16c +$
 64

- 49 e. $y^2 - 8y + 16$ f. $a^2 + 12a + 36$ g. $b^2 + 2b + 1$ h. $s^2 + 14s +$
i. $b^2 - 18b + 81$ j. $x^2 - 20x + 100$ k. $c^2 - 2c + 1$ l. $y^2 - 6y + 9$
m. $4x^2 - 4x + 1$ n. $25y^2 + 20y + 4$ o. $9x^2 + 24x + 16$ p. $16b^2 - 40b$
- +24
Q8. a. $ac + bc + ad + bd$ b. $6 + 3x + 2y + xy$ c. $ab + 4b + 5a + 20$
d. $pr - qp - ps + qs$ e. $7 - 7a - b + ab$ f. $cd - 6d + 8c - 48$
- Q9. a. $x^3 + x^2 - x$ b. $6x^2 - 9x + 15$ c. $3x^3 - 5x^2 + 8x$
d. $2x^3 + 4x^2 + 6x$ e. $-5x^2 + 40x - 10$ f. $x^3 - 4x^2 - 7x$
- Q10. a. $x^3 + 5x^2 + 7x + 2$ b. $x^3 + 9x^2 + 22x + 10$ c. $x^3 + 6x^2 + 9x + 4$
d. $x^3 + 4x^2 + 8x + 15$ e. $x^3 + 10x^2 + 19x + 24$ f. $x^3 + 11x^2 + 34x +$
- 24 g. $x^3 + 13x^2 + 19x + 84$ h. $x^3 + 13x^2 + 39x + 90$ i. $x^3 + 21x^2 + 115x +$
63 j. $x^3 + 16x^2 + 64x + 7$ k. $x^3 - 2x^2 - 13x + 6$ l. $x^3 - 7x^2 + 17x -$
66 m. $x^3 - 6x^2 - 13x + 6$ n. $x^3 - x^2 - 23x + 35$ o. $x^3 + 13x^2 + 34x -$
60 p. $x^3 + 14x^2 + 39x - 54$ q. $x^3 + 12x^2 + 9x - 22$ r. $x^3 + 15x^2 + 53x -$
- 21
Q11. a. $x^3 - 1$ b. $x^3 - 4x^2 - 16x - 35$ c. $x^3 + 2x^2 - 5x - 6$
d. $x^3 + 2x^2 - 23x - 4$ e. $x^3 - 5x^2 + 11x - 15$ f. $x^3 - 11x^2 + 32x -$
12 g. $x^3 - 5x^2 + 6x - 8$ h. $x^3 - 3x^2 + 9x - 7$ i. $x^3 - 6x^2 - 29x +$
18 j. $x^3 + 3x^2 - 34x - 30$ k. $x^3 - 7x^2 - 15x + 56$ l. $x^3 + 6x^2 - 39x +$
36 m. $x^3 - 9x^2 + 19x + 5$ n. $x^3 - 13x^2 + 22x + 80$ o. $x^3 - 13x^2 + 40x +$
12 p. $x^3 - 18x^2 + 4x + 13$
- Q12. a. $2x^3 + 14x^2 + 29x + 45$ b. $5x^3 - 14x^2 + 3x - 18$ c. $6x^3 - 17x^2 + 17x -$
14 d. $3x^3 + 30x^2 + 61x - 14$ e. $5x^3 - 21x^2 - 12x + 32$ f. $7x^3 + 5x^2 + 9x +$
11 g. $6x^3 + 11x^2 + 6x + 1$ h. $3x^3 - 29x^2 - 38x + 8$ i. $10x^3 + 11x^2 - 41x$
+14 j. $12x^3 - 29x^2 - x + 12$

